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KEYFRAME MAGAZINE

The Editor
Doug Kelly *dakelly@megalink.net*

Advertising Rep
Tiffani Banaszak *keyframe1@aol.com*

Art Director
Tiffani Banaszak *keyframe1@aol.com*

Co-Conspirators, Writers, and Artists
Sam Bowling
Bill Fleming *bill@komodostudio.com*
Jason Goodman *jason@msd-nyc.com*
Blaine Holm *blaine@videohardware.com*
Julian Kain
Brenden Mecleary *bman2@ix.netcom.com*
Matt Morgan *matt@threshold-digital.com*
Kim Oravecz *kimo@en.com*
Steve Pugh *steve@foundation-i.com*
Michael Reiser *mikereiser@aol.com*
Lee Stranahan *lee@stranahan.com*
Phil South *phil_south@hotmail.com*
David Warner *dwarner@albany.net*

The Digital Underground
DMG Publishing
2756 N. Green Valley Pkwy. #261
Henderson, NV 89014
702-990-8656

How To Get It
888-778-WAVE
http://www.keyframemag.com

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No dongles were harmed in the making of this publication.

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EDITORIAL

VFX GOLDEN AGE OR GARBAGE AGE?

The last six months have seen an incredible explosion of professional-level tools available for LightWave users. The software and hardware necessary to create truly realistic or awe-inspiringly fantastic imagery used to be beyond our individual reach. Realistic hair and fur, properly draping cloth, rippling muscles, translucent skin, bright and deep eyes, real-world matching of lights and camera; these are the tools we have needed all along, and now they are available for a very modest investment of money and time. Future issues of *Keyframe* will continue to cover these new tools, including the just-shipped L[6], with in-depth product reviews, tutorials and professional case studies.

What used to require true creative genius to work around the limitations of the tools has now been boiled down to a series of recipes that any competent technician (or dedicated hobbyist) can follow. This has raised the visual effects performance bar again. If you don't at least follow the available recipes to create the minimum standard of quality, you haven't got a prayer as a VFX craftsman, let alone artist. Fortunately, achieving that minimum standard is not too difficult.

If you can master the professional-level LightWave techniques documented by others, you can land (and keep) a job in game, TV or film production. In the past, you often needed skills in other software running on more expensive hardware platforms as a back-pocket insurance policy to stay employed. There just wasn't enough LightWave work to keep everyone on a payroll. Now there are enough large studios relying on LightWave as their main production tool that a competent LightWave artist can reliably land another job within days of a project shutting down. LightWave modelers, animators and TDs are now members in good standing of the VFX 'project gypsy' community.

Fantastic reality is now a commodity. The producer's point of view has always been, "If you have the money, you can buy the effects you want." Now the price of a convincing effect is lower than ever, and the cost of a merely passable effect is dirt cheap. Unfortunately, the suits seem to be forgetting (as they often do) that the best effects in the world won't save a lousy script. I won't go through the depressingly long list of recent TV and film productions that have slimed their way across the public's eyeballs with gee-whiz effects and sophomoric writing.

All we can do as media consumers is vote with our wallets, and try to reward those productions that actually make an effort to tell compelling stories which also happen to include good CGI effects. All we can do as effects artists is the best technical work we are capable of, and to try whenever possible to influence the content of our work toward a higher standard. If you love storytelling in any form, please exert whatever influence you have at every stage (the earlier the better!) to make stories more compelling, characters more believable, and effects more integral to the final product.

Let's all do our best to make this a new Golden Age of visual effects, not a Garbage Age.

Doug Kelly

Ear to the Wall

News from the LightWa

Leading UK Animation Artists Launch New Facility

Four of the UK's leading CG artists, together with Scottish new media group VIS Interactive plc, have launched Axis Animation, a high end 3D and digital post-production facility based in Glasgow, Scotland.

Axis will target the advertising, broadcast, film and computer game markets for animation and visual effects.

The new studio was created by *Keyframe* contributing writer and cover artist Graham McKenna with fellow colleagues Richard Scott, Stuart Aitken and Dana Dorian, who had previously formed the core art team at award winning digital content creators Digimania. They shook hands on a deal with VIS CEO Chris Van der Kuyl late last year.

Further information on the studio can be found at http://www.axisanimation.com.

An X File

SAN JOSE, Calif. - March 10, 2000 - Bill Gates announced today at the annual Game Developers Conference that Microsoft Corp. is entering the video game world with the introduction of a future-generation dedicated video game console, currently code-named X-Box, designed to deliver intense, action-packed games. Building on the company's software expertise and advances in PC technology - such as 3-D graphics and Internet connectivity - Microsoft is developing a high-performance, easy-to-use platform that will enable developers to create better games, faster.

Unlocking New Gameplay Experiences

Familiar tools such as the Microsoft® DirectX® API will inspire movie-quality rendering, enhanced Internet gaming, and superior audio in future-generation games. X-Box will catapult gameplay quality to new heights by delivering the following:

· Realistic gameplay will be delivered by the high performance of Intel Pentium III processor technology with Streaming SIMD Extensions.
· More than three times the graphics performance of the newest-generation game consoles will be offered. Co-developed with experts at NVIDIA, the custom-designed graphics chip will deliver more than 200 million polygons per second.
· Rich, fast-action and realistic experiences will be enabled by the X-Box hard drive.
· Broadband Internet connectivity will extend the game experience.

Combining the power of PC technology with the accessibility of its cutting-edge DirectX development tools, Microsoft is providing game developers with a maximum-performance creative medium to deliver better games.

I Am A Sci-Fi

Valencia, CA - February 23, 2000 - Emmy Award-winning visual effects house Foundation Imaging has been selected to perform their magic for another spot in the Sci-Fi Channel's "I Am Sci-Fi" campaign. In the ad, inspired by the end sequence from *Close Encounters* and featuring techno-wizard Moby, Foundation is providing a turntable-inspired mothership going head-to-head with the noted performer.

Moby was filmed at a small DJ booth on a greenscreen stage, and Foundation will be compositing him into a computer-generated environment recreating Devil's Tower, Wyoming. Says Senior Compositor Sherry Hitch, "I love Moby's music, and together with the *Close Encounters* theme it's a pleasure to be working on this spoof of one of the greatest effects films of all time for the Sci-Fi Channel."

This is the third spot Foundation Imaging has done for the network's "I Am Sci-Fi" campaign, following a "2001: A Space Oddesy"-inspired sequence featuring Richard Branson, and a spot featuring the Minnesota Timberwolve's Kevin Garnett slam-dunking amid a space battle.

Foundation Imaging was formed in 1992 by Ron Thornton and Paul Bryant. Since its inception, the company's projects have included visual effects for feature films ("Contact", "The Jackal"), television series ("Star Trek: Voyager", "Star Trek: Deep Space Nine" for Paramount Television, "Mystic Knights of Tir Na Nog" for Saban Entertainment), home video ("Batman: Subzero" for Warner Bros. Home Video), and themed attractions ("Star Trek: The Experience" for Landmark Entertainment Group and "Titanic" for Technifex). The company also recently completed production of 31 episodes of the entirely computer-generated animated program "Roughnecks: The Starship Troopers Chronicles" for Sony Pictures Entertainment/Columbia TriStar Childrens' Programming.

The Amazing Spider, Man!

STATIONX Santa Monica, CA - 3/8/00 - Station X Studios today announced the upcoming release of Station X: Spider version 1.3, the professional solution for distributed render management for Windows NT. The software will begin shipping on April 10th of this year. Version 1.3 augments an already impressive list of features. Station X: Spider will now incorporate full support for Maya networked rendering, and becomes the first and only render management software of its kind to do so. Maya joins Lightwave 3D and Chalice as applications supported by Station X: Spider.

In addition to the new support for Maya and the extended feature set, Station X: Spider is now being offered with a new pricing structure. CPU licenses are priced at $89 for Lightwave 3D and $99 for Chalice and Maya. Station X Studios is also offering Spider site licensing for $6000.

Features added to version 1.3 of Spider include the following:
- render settings can be changed from within the Spider interface
- Spider will locate and patch missing frames within a sequence
- rendered frames can be viewed
- email notification containing job statistics is sent on render completion

Further information on Station X: Spider can be obtained on the web at http://www.stationXstudios.com/Spider or by emailing Spider@stationXstudios.com.

L[6] - Make Yourself Giggle

SAN ANTONIO, March 7, 2000 - NewTek, manufacturer of industry-leading 3D animation and video production products, announced today that LightWave [6] for NT is shipping to customers Worldwide. LightWave [6] is the culmination of over ten years of development and represents the most significant upgrade to LightWave in the history of the product. LightWave [6] advances the state-of-the-art in professional 3D animation by adding a comprehensive set of advanced character animation tools, groundbreaking rendering capabilities, next generation modeling paradigm, new and improved architecture and a refined work environment.

LightWave, the recognized leader in the film and television industry, provides the most complete feature set of any 3D animation tool available. LightWave [6] offers breakthrough rendering technologies, advanced animation tools, and a new modeling paradigm as well as improved workflow, better control over texturing, customizable user interface and extensive improvements to real-time views. LightWave [6] is the only 3D software system to run on Macintosh, Windows NT, Alpha and Silicon Graphics systems.

"During the last week I have been irresistibly drawn to my computer. I am now officially addicted to LightWave [6], especially the new modeler. I have never had so much fun modeling in my life," said Bob Cazzell, systems manager for REZN8 Hollywood. "'I'm sitting here working with all the new tools, and the improved old ones, just building, building, building. Building new models, loading old ones (testing legacy stuff you know) and starting to rebuild them because I get all kinds of new ideas of what I can do with the new modeler and literally giggling with the results! I'm sure we all enjoy what we do, but for me, it's been awhile since I've had SO MUCH fun doing it. And for me that's what it's all about!"

Version 6.0 Takes LightWave 3D's Proven Success to Even Greater Heights

Groundbreaking Rendering Technologies

LightWave [6] introduces a number of new rendering technologies, including the following:

· radiosity and caustics rendering for the calculation of indirect light as it bounces from diffuse, reflective and refractive surfaces, which allows LightWave [6] to deliver the nuances of lighting better than any other 3D package on the market;

· a 160-bit IEEE floating-point rendering pipeline assures ultimate color depth and accuracy adding exceptional richness and realism to the imagery; the engine dynamically scales from 160 bits to 320 bits depending on the requirements of the scene;

· HDRI (High Dynamic Range Imagery) allows scenes to be illuminated entirely from original photographs. This allows for an easier lighting method that provides a much higher level of photorealism. HDRI also utilizes internal data generated from high intensity 3D lights and even effects such as caustic light reflection and refraction;

· sub-pixel displacement rendering for the creation of realistic volumetric surfaces such as water, clouds and gels with incredible precision and speed;

· advanced HyperVoxels for direct ray tracing of volumetric surfaces, optimizations that make HyperVoxel rendering 400% faster;

· Soft Body Dynamics engine (Motion Designer for LightWave {6}) simulates animation effects for cloth, hair and other soft body systems. Users can select from a library of materials such as silk, rubber or jelly or create their own physically accurate material. Natural forces including gravity, wind, and turbulence can be added to the simulation.

· a volumetric lighting model optimized for a more than 300% boost in speed with full texture support for innovative new volumetric lighting effects and;

· VIPER (Versatile Interactive Preview Renderer) provides users with an interactive preview of key elements of a scene that traditionally require time intensive full scene renders such as procedural texture changes, volumetric lights and HyperVoxels editing. VIPER can be used to interactively preview single frames or even create preview movies of selected elements.

"LightWave is simply one of the best 3D animation products on the market, and 99% of the projects we do at Digital Muse are done using LightWave," comments John Gross, founder and co-owner of Digital Muse, one of Hollywood's leading visual effects facilities. "LightWave's ease of use and the ability for a new artist to learn it quickly is very important in a production environment like ours. The quality of output from LightWave's renderer is remarkable and very important as we work on a number of high-profile movie trailers, television episodes, commercials and feature films."

Character Animations and Game Development Advancements

Unique to LightWave [6] is a new breed of character animation tools called IntelligEntities. IntelligEntities consist of Skele-

gons, Endomorphs and Multi-meshes, which allow objects to carry data well beyond simple geometry.

· Skelegons are a new type of polygons that appear like traditional 3D bones. These Skelegons are saved as part of the object so that a character always has an intact skeleton. With Skelegons, as modifications are made to a character the bone structure is automatically updated. Skelegons provide an enormous arsenal of tools for creating bone structures as well as fantastic control and maintenance of characters

· Endomorphs allow the change of expression, mood, or action by training a single model. The use of Endomorphs provides for the simple creation of lip sync and complex morphing scenarios.
· Multi-meshes embed multiple layers of geometry into a single object. With Multi-meshes, hierarchical objects are saved as a single, complete model with all of the defined relationship and pivot data included.

LightWave [6] introduces a hybrid Inverse/Forward Kinematics engine that improves on what is already the industry's most flexible Inverse Kinematics (IK) engine. This hybrid system combines the strengths of Inverse Kinematics for making sweeping changes to a number of joints with the precision and direct control of Forward Kinematics. Free-form and locked IK goals allow users to have goal items that are locked to the length of the chain or that use a rubberband-style goal that can float in space away from the chain itself. In addition to introducing Endomorphs, Skelegons and Multi-meshes, LightWave [6] enables vertex grouping for bone assignments, resulting in greater control of anatomically precise characters.

For realistic motion of any kind, but for characters in particular, it is important to have precise control of the motion curve. With LightWave [6] the curve editor has been completely rewritten providing flexibility and a robust feature set. Curves can now be created with multiple tangent types including Bezier, Hermite, TCB, Linear and Stepped. These tangent types can actually co-exist on a single curve. Because each curve type has specific benefits, it is tremendously useful for fine tuning motions. The graph editor provides a rich set of tools for manipulating curves of any type and allows interactive copy and paste between those curves.

Price and Availability
LightWave [6} for NT is now available for a suggested retail price of $2,495. Customers can purchase LightWave [6] through authorized NewTek dealers. Registered users of LightWave 3D 5.6 can upgrade to LightWave [6] for $495; upgrades are available through authorized NewTek dealers. Customers can find retail dealers selling LightWave by visiting the NewTek Web site (www.newtek.com) or by calling 1-800-862-7837.

Dynamic Realities, the world's largest developer of plug-ins for NewTek's LightWave 3D, has announced that IMPACT! version 2 will be shipping mid-April.

This long-awaited upgrade to the first ever rigid body dynamics software for LightWave adds many new features, such as:

• Rope and Chain connectors, to allow items to swing.

• Wheels and Gears move with the motion of your objects.

• Advanced collision detection, allowing any and all objects in your scene to interact with each other.

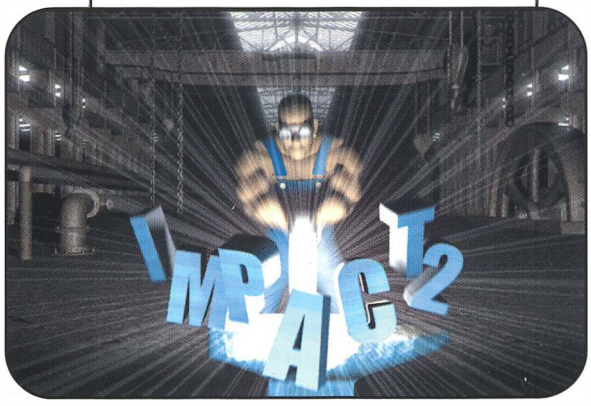
• Fast simulation time.

• Easy to navigate OpenGL interface.

• Completely integrated into LightWave 5.6 and 6.

Price and Availability
IMPACT! v2 will be available the later part of April. Upgrades to registered users of version 1 are $395, and new versions for the Intel, Alpha, and Macintosh are $595.

Contact Dynamic Realities at 800-944-5520 or www.dynamic-realities.com for more information.



Up Close and Personal

by Jason Goodman

So what are you doing with your LightWave 3D and Video Toaster creations these days? That is to say, how are people viewing your work? Chances are your stuff is either on TV, in feature films or available for rental at the local Blockbuster. Or perhaps you're not a porn star caliber VFX artist. You do still have clients. How do they see your work? Is it on Beta SP, the web, VHS, CD-ROM, 3/4, MiniDV? All of these mediums have their pros and cons. Only one seems to embody the best qualities of each of them. It is DVD. DVD offers image and sound quality near that of Beta SP. It offers the universal compatibility of a home standard like VHS and a convenient form factor like a CD.

Unfortunately, making a DVD is not as simple as shoving a tape into a VCR and hitting record. If you have been hankering to crank out your own DVDs since you first saw the shinny little suckers, but were put off by the price and complexity, you may be in for a surprise. I had a chance to review two low-cost DVD authoring packages, Sonic's DVDit! SE and Astart 's DVD Export. Both of these tools are leading the revolution, making it possible for independent professionals to produce their own DVDs on a budget.

If you already own a Video Toaster or other NLE you are part of the way there. There are several steps in the process of making a DVD, only one of which is capturing footage. Video on a DVD is stored in the MPEG2 format. The Video Toaster is currently not directly able to make these MPEG2 files. It can, however, make uncompressed AVI files, which can be turned into MPEG2 video by other tools. Almost any other non-linear editor can do this as well.

My choice for converting digital video into MPEG2 files for DVD is Heuris MPEG Power Professional 2. This is a software-based MPEG2 encoder that has a wide array of features and settings. Used in conjunction with Terran Interactive's Media Cleaner Pro 4, MPP2 is a powerful, flexible solution. Running on multiple CPU, GHz-speed Wintel machines or high-powered G4 Macs, MPP2's software encoding is rapidly approaching the speed of hardware encoding, and the image quality is superb.

Let's put encoding aside for a moment and talk about DVD authoring. DVD authoring is the process of laying out all of your menus, navigation, audio and video files in a format that DVD players can understand and use. Until recently, this has been a complex process that required expensive high-end systems. DVDit! SE from Sonic Solutions and DVD Export from Astart are two products that are bucking this standard. Both are powerful and easy to use, and most importantly, both are priced a $499. Each product is a quantum leap in price performance in the DVD authoring arena.

DVDit! SE is a stand-alone application that runs only on Windows 95, 98, NT and 2000. Astonishingly, DVDit! SE has an MPEG2 encoder built right in! The program is worth its price for this feature alone (MPP2 is $2500). I must admit, I was skeptical of this feature, but I was blown away by the image quality the built-in MPEG2 encoder offered. The clip that I tested it with was not terribly high motion, but I could not tell the difference between MPEG2 files created by DVDit! SE, MPEG Power Professional 2, or Astart 's encoder. DVDit! SE took slightly over an hour to compress a twenty-five second video, so it is not quite as fast as higher-end encoders, but I was still extremely impressed.

Figure 1: DVDit! SE has a minimalist interface.

Figure 2: DVDit! SE provides a simple interface for converting AVI files to MPEG.

DVDit! SE has a simple drag-and-drop interface that is very easy to use. I found the included tutorial a bit confusing, but once I investigated the pleasantly Spartan menu options, DVDit! SE was quite easy to figure out. It is basically "DVD authoring for dummies." If you like those books, this is the software package for you. It allows the user to remove him or herself from the nitty-gritty of authoring to a very large extent. DVD videodiscs are easily assembled and formatted for burning to DVD-R, CD-R, disc image or DLT tape. Impressively, DVDit! SE is designed to interface directly with CD-R and DVD-R drives, making it a full soup-to-nuts solution. However, I did not have the opportunity to test this feature.

DVDit! SE's funky interface, Figure 1, is like Kai Krouse meets the Jetsons. It is more attractive than useful, but it is certainly straightforward. The user loads a bunch of images into the backgrounds bin, a bunch of videos into the media bin, and a bunch of buttons into the button bin. DVDit! SE accepts a wide variety of image file formats, but only AVI or MPEG video formats. I would like to see support for QuickTime files in a future version. Backgrounds are simply dropped on screen, and buttons (or videos which are automatically turned into buttons) can be dropped right over them. It could not be easier. As I mentioned earlier, the built-in MPEG2 encoder allows you to use any type of AVI video as a source file. The user can select a constant bit rate for encoding via a quality/file size slider, Figure 2. All the video and audio is converted to DVD format automatically by DVDit! SE as a final step when you choose to build a DVD.

For many users DVDit! SE is an ideal system. There is not too much in the way of a learning curve. Ease of operation is DVDit! SE's strongest feature. However, I did find that this simplicity made DVDit! SE somewhat limited. It cannot create animated menus, and it does not allow the user to program remote control operations or complex menu navigation with much flexibility at all. Despite these limitations, DVDit! offers a lot of bang for the buck. As far as getting your digital videos on to TV goes, it is, as the package says, the easiest way to publish on DVD. Sonic also offers high-end systems, and will soon release DVDit! PE, a professional edition which should add new features and may address many of SE's limitations.

Those of you looking for a higher degree of control while still staying in the under-$500 ballpark should take a look at Astart DVD Export. DVD Export is available for PC and Mac (a big plus) and works from within Macro-

media Director. DVD Export offers the user a much greater degree of flexibility in controlling the layout of their DVD project. DVD Export allows you to easily add complex navigation by assigning functions to each remote control button at each point in the interface. This enables you to create an interactive DVD with much more robust menus and navigation than those possible with DVDit! SE. Although DVD Export also does not create animated menus, you can choose to have buttons play videos that lead to more menus, creating the illusion of animated menus. This is a huge benefit.

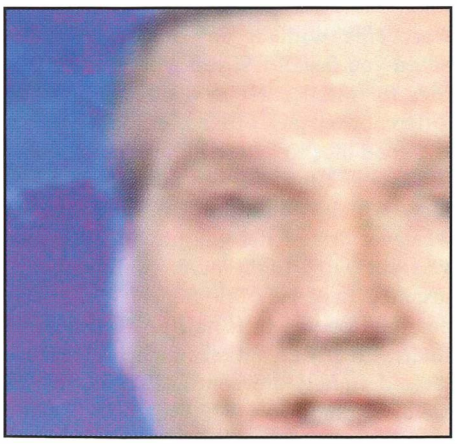
DVD Export also sports a drag and drop interface, but there is one caveat. As an Xtra for Macromedia Director, DVD Export cannot function as a stand-alone application. If you do not have Director on either the Mac or the PC, you will not be able to use DVD Export. For some users, this effectively adds eight hundred bucks to the bill. This also has the potential to add somewhat of a learning curve to the program. DVD Export's interface is based on the Director interface, Figure 3, and can be overwhelming to the uninitiated. While DVD Export is very easy to use, it still relies on many Director conventions that you will need to be familiar with before you can really understand it. If you already have Director and know how to use it, you should love DVD Export. You do not need to know any Lingo (Director's own programming language) to create interactive DVDs on par with the best interactive CD-ROMs or video DVDs I have seen. It is an exceptional product. In just two days, MSD's Director artist, Gil Jawetz, was able to put together a super tight DVD with deeply layered menus and lots of interactivity. In trying to accomplish the same goal in DVDit! SE, I quickly ran into that product's limitations.

Back on the bang for the buck issue, DVD Export does not include an MPEG2 encoder like the one in DVDit! SE. Astart does offer a software-based encoder called M.Pack, Figure 4. Download a free trial version from their website, www.astarteusa.com, and try it out. M.Pack sells for $399 and is also very easy to use. Considering its price compared to other stand alone encoders, M.Pack's encoding quality impressed me as much as did DVDit! SE. I could not accurately gauge its speed because the demo version only lets you encode five seconds of footage. M.Pack is a good choice for users wanting to author entirely on the Mac. M.Pack does have the option of hardware acceleration for real-time encoding as well. Additionally, Astart offers a software Dolby AC3 encoder called A.Pack. A.Pack also sells for $399, and a free trial version is available at the same web site. The modularity and low cost of Astart 's product line make it easy for users to add features as they are needed.

Both programs allow you to preview your project before writing to DVD. This is a handy feature considering DVD-R blanks are still over $30 each. I initially had problems using the software DVD player that came with DVDit! SE on my Windows NT 4.0 machine. Sonic tech support responded very quickly and emailed me a new decoder that worked flawlessly. DVDit! SE uses your actual MPEG2 files in the playback preview. DVD Export can do this if you have DVD playback hardware or software in your PC or Mac, but there are currently no software decoders that I know of for the Mac OS. To overcome this problem, Astart has cleverly devised a system whereby QuickTime videos can stand in for MPEG files during previews. Both products automatically organize the disc structure and create video object files for you, a great convenience.

Overall, I found both of these products to be excellent. Each has clear strengths and weaknesses when compared to the other. If you are looking for the very easiest way to create fairly linear DVDs without investing in additional encoders, DVDit! SE is the clear choice. If you want a much higher degree of control, already have MPEG2 encoding capability, or prefer to work in the Mac environment, DVD Export offers quite a lot. Both products lack some of the highest-end features, but I found that many DVDs do not require these features to be successful. It is exciting to see that developers are striving to bring desktop users more power and capability in the area of DVD authoring. My hat's off to Sonic and Astart .

Jason Goodman is the CEO of NYC-based Multimedia Software Design. You can email him at jason@msd-nyc.com or visit their website, www.msd-nyc.com.



These 400 % blowups show that MPEG Power Professional has the edge in quality, but the difference can be barely noticeable.

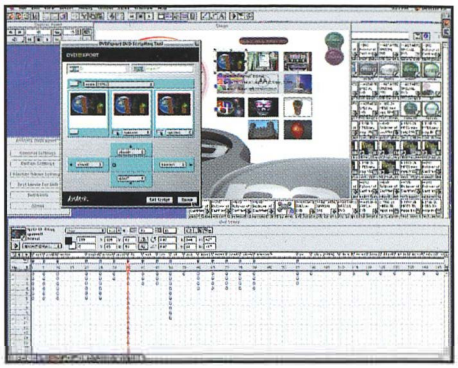
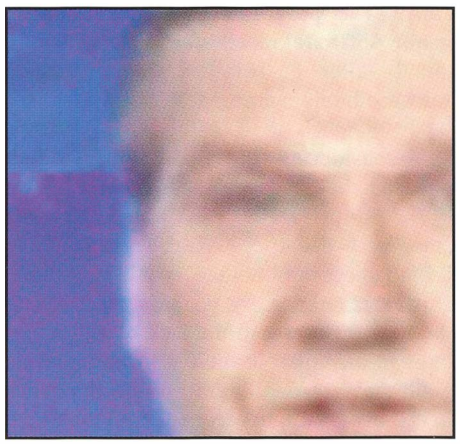
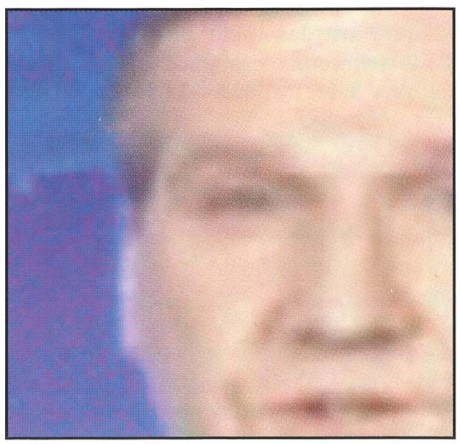


Figure 3: DVD Export gives you a lot of control, but uses the Director interface which can be overwhelming.

Figure 4: Astarté's software encoder is inexpensive and easy to use.





by David Warner

The wait is over and LightWave 6.0 is finally shipping! Frequently referred to as L[6] or just L6, it is without a doubt the most significant upgrade that LightWave has ever gone through. I won't waste space raving about how great L6 is because you can read that pretty much everywhere.

What I would like to rave about is how quickly the LightWave programmers were able to whip this program into shape and get it to the general public. L6 has been in development for a long time, but when NewTek made L6 available for an open beta-testing program it was quite rough (but showed a lot of promise). I did not expect NewTek to have L6 ready for release until April. The programmers knocked out 4 major software patches, and less than 2 months after the beta-test program began, L6 was rapidly nearing perfection.

Considering the list of things that needed to be fixed or spruced up, it was a bit of a surprise to me when NewTek announced that they would begin shipping L6 upgrades around the end of February. However, judging by people's reactions to the new features and the lack of any major bugs in the code, I would say that it was a good move to finally get L6 into the hands of the hungry LightWave community. There are still a number of features that could use some polishing, and there are some things that are just downright annoying. Overall, L6 is well worth the upgrade cost and should be very high on every LightWave user's "must-have" list.

In other LightWave news, our friends at Worley Labs have released two major new products for LightWave, including the long-awaited "Sasquatch" fur & hair shader plug-in, and "The William Howard Taft Collection", an impressive set of high-end plug-ins for LightWave professionals. You can learn more about these plug-ins by going to the Worley Labs website at www.worley.com. Apparently the Worley folks have been cooking up some other L6-specific tools, so it will be very interesting to see what they come out with in the next few months.

Speaking of plug-ins, that brings up an important question about L6 plug-in compatibility. We're still working a list of the casualties. Many important and powerful LightWave plug-ins do not work with L6, and there is some confusion about how this issue is going to get resolved. Most likely, the burden of solving this problem will fall on the shoulders of the third-party developers who created these plug-ins. This is a disappointing blemish on an otherwise exciting and momentous event for LightWave users.

Of course the LightWave mailing list has been caught up in the L6 excitement, with many important questions and answers about the upgrade. In this article, I'll cover some of the more significant topics of discussion.

Q Is it "safe" to have LightWave 5.6 and L6 installed on the same computer? Will they interfere with each other?

A Many people have installed L6 on the same machine that they used for LightWave 5.6 and everything seems to work fine without any major conflicts. When you install L6, you will notice that it tries to install itself in a directory that is different from past versions of LightWave. It is a good idea to let the L6 installer do what it wants and install L6 in the default directory, which would be C:\LightWave or whatever drive letter you provide. Previous versions of LightWave were always installed in a NewTek folder. While it is possible for you to install L6 in that same folder, I really do not recommend it because there definitely are conflicts with some of the older plug-ins.

The only minor conflict that you may notice with LightWave 5.6 and L6 installed on the same machine is that the file associations for all of the LightWave file-types will be changed to open L6 applications. So if you double-click on a LWO LightWave object file, the L6 version of Modeler will be launched, instead of the old version of Modeler. Of course, this is not necessarily a bad thing because you will probably want to start using L6 right away.

A word of warning: if you are in the middle of a project when you receive your L6 upgrade, it's a good idea to resist the temptation to use L6 on that project. L6 objects and scene files are not backward compatible with LightWave 5.6, so if you run into some sort of problem with L6, you may not be able to bring that project back into LightWave 5.6. My advice is to finish any LightWave 5.6 projects that have a deadline approaching, and use L6 only for new or open-ended projects that are not time critical.

Q One thing that always annoyed me about version 5.6 of Layout is that the keyboard shortcuts did not adhere to the Windows standards. Has this improved with L6?

A Many of the default keyboard shortcuts in Layout and Modeler 6.0 are the same as in LightWave 5.6, but you now have the ability to change any and all keyboard shortcuts to whatever you want them to be, Figure 1.

Q I want to add all of my old plug-ins and get everything set up correctly in L6, but I don't see the SuperConfig program that came with LightWave 5.6. Also, what happened to LightWave's .CFG config files? I don't see them anywhere in the L6 install directory.

A SuperConfig was not supplied with the current version of L6, but it will probably return with future releases. However, if you are running L6 on Windows NT, it is now possible to add multiple plug-ins at once by multi-selecting them from the

Figure 1: L6 now allows you to customize all keyboard shortcuts.

Add Plug-ins requestor. Unfortunately, this does not work for Win95/98 users.

As for the config files, you can now find them in you Windows directory. There are 3 different files now, LW3.cfg is the config file for Layout, LWM3.cfg is the config file for Modeler, and LWHUB.cfg is the config file for the LightWave Hub.

Q I see on the NewTek web-site that they are recommending people use Windows NT for any system running L6. Does the new version of LightWave run OK on Windows 95/98?

A Yes, NewTek is recommending that people run L6 only on an up-to-date Windows NT machine, but that is only a recommendation. L6 does, in fact, run quite well on Win95/98. However, some people have reported OpenGL display errors when using L6 with some of the low-end OpenGL graphic accelerator boards that are prevalent on the Win95/98 platform.

The problem is that many of these low-end cards are designed mainly for game playing, and they do not support all of the OpenGL display modes. L6 really pushes OpenGL cards to their limits and takes advantage of many of the powerful new features found in the OpenGL 2.0 display libraries. Unfortunately, many of the cheaper OpenGL cards just don't work very well for high-end stuff. L6 will work OK with these low-end OpenGL cards, but you may see display errors in the OpenGL previews. These errors can be misleading when you are modeling objects or setting up a scene.

There is no firm list of which OpenGL cards work well with L6 and Win95/98, but this is a fairly common problem throughout the Win95/98 platform and is certainly not limited to L6. OpenGL card manufacturers are aware of the problem and should be doing something about it, since most of these problems can be corrected with the release of a new set of OpenGL drivers. If you try to run L6 on you Win95/98 machine and notice some display errors, you should contact the manufacturer of your OpenGL card to see if there are any updated drivers available that may correct the problem.

Q I hate the "brushed metal" background and gradient button faces...it makes learning the new interface very difficult. Is there any way to turn off these options and make the new LightWave interface look more like the clean and professional interface of older versions?

A Many people have complained about this...in fact, it's one of the few L6 changes that I think most people are unhappy with. Unfortunately, at the time I'm writing this, there is no way to alter the appearance of the L6 interface. Hopefully by the time you read this there will be a feature in one of the patches that allows us to modify the interface.

Q When I start the new Layout or Modeler, a program appears in my Windows taskbar called "Hub". What is this and why does it not go away when I exit from Layout and Modeler?

A The Hub is a sort of communications link between Modeler, Layout, and (eventually) plug-ins and other programs. It allows for data to be exchanged between different applications. Suppose you are working with an object in Layout and decide that you want to make a small change to it. You can jump to Modeler, modify the object, and the changes will automatically be applied to the object in Layout without your having to save or export the altered object. This is pretty much the same as what the Get & Put functions did in the 5.6 version of Modeler, but it's all done automatically now. This opens the potential for some extremely powerful animation effects.

The Hub is one the features in L6 that still feels a bit underdeveloped. This is probably because there just aren't very many things out there that tap into its power yet. We will probably see some animation tools that allow us to alter the shape of an object based on external data streams (like live character motion capture) or give us the ability to keyframe modeler functions (like animating the construction of a complex object piece by piece). Of course, this is all conjecture on my part. Only time will tell what The Hub will truly mean for L6 users, but I don't think we'll have to wait long to see it in action.

As for the problem with The Hub not shutting down when Layout and Modeler are closed, I don't think this is a bug. The Hub is a separate part of the L6 framework, and it probably continues to run so that data is held in memory, just in case you decide to launch Layout or Modeler again. It is easy enough to shut down The Hub. Just put your mouse pointer over the Hub taskbar icon, click the right mouse button to bring up an application menu, and choose Exit. I hope that NewTek will put an option in one of the L6 config files so that you can have The Hub shut down automatically when you exit from Layout and Modeler.

Q I heard that the new Layout will work with MetaNURBed objects, but when I try to load any of my old MetaNURBed objects created with Modeler 5.6, the objects are not visible. What's going on here?

A The LightWave object file format has changed significantly with version 6. While most normal objects will load into Layout without any trouble, it is necessary to first import MetaNURBed objects into the new version of Modeler and re-save them. Once a MetaNURBed object is saved in the new L6 object file format, it will work perfectly in Layout.

That's about all we have room for in this issue. Next time we'll start getting into the awesome new features found in LightWave 6.0!

For those of you who enjoy reading this column and find a great benefit from the knowledge exchanged on the LightWave Mailing List, I encourage you to check out a new product my company has just released. The LightWave Mailing List Search Engine CD contains nearly 87,000 messages, compiled in a format that is easy to search for any topic that has been discussed in the past 3 years! It is available now for only $19.95. This is a valuable information resource for all LightWave users. You can find out more by visiting www.tv3d.com.

For more information about David Warner or TutorVision 3-D CD, his series of multimedia tutorial CD-ROMs for LightWave, please visit http://www.tv3d.com or e-mail Dave at dave@tv3d.com. The newest release, Volume 3, contains more than 6 and a half hours of video and a total of 26 different lessons for LightWave!

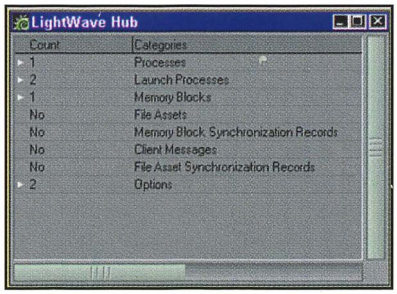


Figure 2: The LightWave Hub interface doesn't show much right now, but the potential is great!

LightWave Guidelines for Interface Design

PROGRAMMER'S HIDEAWAY

by Brenden Mecleary

Howdy, and welcome back to the Hideaway. Well, L[6] is shipping. However, I don't have it yet, and I don't use LightWave enough in my day-to-day routine to spring the $500 for the upgrade. Naturally, this makes it rather hard to cover the new developments for plug-ins in L[6]. So, if any kind soul out there (perhaps one of you NewTek folks) could spot me a copy, that would be a Good Thing. For the rest of you, send me your feedback! I want to cover topics that are useful to all of you, but without any idea of what is useful to you, it's hit-or-miss at best, and I'm running short on ideas.

On to this issue's topic. Let's start with the one prevailing rule for developing LightWave plug-in interfaces: use LWPanels! LWPanels may be clunky and quirky at times, but it beats out all other choices. With it, you get support for Intel, Alpha, Mac, SGI, and any other platforms on which LightWave runs. At the risk of sounding like your grandparents, I'll tell you to thank your lucky stars that you even have LWPanels. Back in the early days, you were forced to write your own interfaces using whatever platform-specific methods applied. What advantages does LWPanels offer? First, as mentioned, it's portable. Second, it's consistent with the UI of LightWave. When NewTek moved from LW 5.0 to 5.5, all plug-ins that used LWPanels got a free upgrade to the new user interface look, no re-compile involved. And finally, let's face it, LWPanels is just pretty darned easy to use. Anyone who's ever hand-coded a user interface in Win32 (no, the MFC dialog editor doesn't count) knows what I mean. Now we'll move on to specific style tips for designing your LWPanels interfaces. (You are going to use LWPanels, right?)

Align the *hot zones* of controls. The hot zone is the area that the user interacts with; basically, it includes everything that is not the label. For example, the hot zone of a STR_CTL is the box with the string the user enters. The hot zone of a POPUP_CTL is the button the user clicks to present the drop-down list. By aligning the controls in this way, the user's eye can move in a roughly straight line across the controls in the panel. The difference between a panel that has been laid out this way and one that hasn't is striking. Because the label is often placed to the left of the hot zone, aligning the controls gets a little tricky when you have multiple controls with differently sized labels. You can hard-code the location you want to align all the controls, but a better idea would be to measure the labels of the controls and add about 10 pixels for the panel's margin. Listing 1, below, is an example of a function that will align a control's hot zone at the given X coordinate.

```
//
// void AlignHotZone(LWControl * const pctlToAlign, const int
iPosition)
//
//    Sets a control's "hot" zone to the specified X location.
//
void AlignHotZone(LWControl * const pctlToAlign, const int
iPosition)
{
    const int iControlX             = CON_X(pctlToAlign);
    const int iControlHotX          =
CON_HOTX(pctlToAlign);

    ival.intv.value = iPosition - (iControlHotX - iControlX);
    pctlToAlign->set(pctlToAlign, CTL_X, &ival);

    return;
}
```

Do *not* hard-code control positions. LWPanels is mostly consistent, but there are sometimes small differences (on the order of a few pixels) between platforms. Different fonts between systems also mean that you can't count on a string to be the same size on two different copies of LightWave. A safer approach is to lay out your panels, decide on the controls that will be your border controls on the left and top, then lay out other controls relative to them. LWPanels provides macros to get the width and height of a control, which is your best bet in this situation. These macros have had a couple of bugs in the past, and may still have them, so you should test the macros thoroughly before you rely on them.

Group controls logically. Add a custom draw function to your panel that uses the drawBorder() function to draw boxes around controls. If you have multiple controls that display some results from the settings the user has entered, locate them next to each other and box them. If you call drawBorder() with a height parameter of 0, it will draw a horizontal divider. These are very useful, and should be used to split up major sections of a panel. When using the drawBox() horizontal divider, I like to allow somewhere between 2 and 5 pixels between the divider and the edge of the panel. If you do this, the panel will look like one sheet divided into several sections. If you use the divider all the way to each edge, the results will look more like multiple panels.

Dynamic UI is cool. Not an animated UI (don't move controls around), but a smart user interface that doesn't force

the user to deal with controls that don't apply. The best way to do this is to ghost controls when their values are meaningless. For example, let's say your plug-in does refraction, among other things. If you have a checkbox that activates your refraction calculations, you should ghost the field labeled Index of Refraction when the checkbox is turned off, and un-ghost the field when the checkbox is turned on. You can do this by adding user event functions to controls that can enable or disable other controls. Such functions are usually small, almost always less than 10 lines. Stick them at the end of your source code so they don't get in the way. Use similar functions to update one value when a related value changes. This will prevent the user from being confused by two numbers that apparently report different values.

Whether you just disable or entirely remove controls is up to you. I generally prefer disabling controls, as it allows the user to know that the control is still available, it's just not something they can touch right now. If you remove the control entirely (by hiding it), the user may find himself wondering where it went, and how to get it back! Tab controls are an exception. Tab controls are a Good Thing, and when they change, you should hide the controls from the previous tab. In some circumstances, a POPUP_CTL or an HCHOICE_CTL can serve roughly the same function as a tab control, and hide/show controls when it is changed.

Animated parameters are good. Users like them, and they make your plug-in more useful. Of the multiple ways to animate parameters (which I discussed in this column in Keyframe #16), envelopes are usually ideal, followed closely by null objects. Nulls are useful enough that you might consider allowing the user the choice between an envelope and a null object. Animated parameters derived from numeric fields (e.g., "Field X changes by Y units per second") suck. There's almost nothing good that can be said about them.

The only thing to be careful of when animating parameters is to not go overboard. The following story is absolutely true. I was working on a plug-in in RealiTools 2 back in 1998, and having just discovered envelopes, I set about animating every parameter on this plug-in. I finished compiling, fired up LightWave, and opened my plug-in. I spent some time reveling in the glorious, flexible, animating UI that I had just designed. Then I went through and double-checked the controls to make sure they looked right. Then I noticed the little "E" button next to two fields named "Start Time" and "End Time". That's when it struck me:

I had animated *time*.

Although this would have actually worked, and Einstein might not have had any trouble with it, I got a headache just thinking about it. After a few horrible visions of users' heads exploding trying to grasp the concept of animated time, I went back into Visual C++ and removed the offending envelopes. This illustrates another design guideline: Don't kill your users.

Real-time previews are good. Real-time previews in LightWave are hard to do, largely because of the lack of support for good panel drawing. L[6] solves this by allowing you to double-buffer your drawing operations to an off-screen surface, then blit when ready. But until then, there are several ways to get around this problem. First, look into the OpenGL control. You can do quite a few tricks with the OpenGL control if you know what you're doing. You can even paint your own texture, then use it to draw a 2D polygon across your entire control, to do faster paints.

Short of OpenGL, you can draw directly on your control using the drawfuncs structure provided by LWPanels. For simple previews, you can speed your drawing by calling the drawRGBBox() function. This is particularly useful for, say, gradient controls. The primary advantage of this is that it is much faster than drawing each pixel yourself. A box fill is usually done in hardware, and is much faster. The LightWave gradient control is one example, as is the gradient control in the RealiTools 2 Fresnel plug-in. These both work in real-time, with no visible redraw even on a really slow system.

For more complex previews, you'll probably need to draw every pixel yourself. This is slow, and gets slower as the size of your drawing area increases. RealiTools 2 Fresnel also has a shaded sphere preview window. This is small, about 50 by 50 pixels, but is still slow enough that it does not update in real-time. The user must click on it to have it redraw.

If you do add some sort of preview, give some thought to reusability. A well-designed preview window can be used by multiple plug-ins. The preview sphere in LightWave, as well as the one in Fresnel 2, is one example. The plug-in doesn't have to do anything special to support the preview window; the plug-in simply hands it the instance pointer and the pointer to the appropriate evaluate function. The preview sphere service I wrote even supplies fake raytrace() and illuminate() functions, which the plug-in can call. The gradient service needs just a single callback function to supply the color at a given spot in the gradient. It tells the plug-in where it is (from 0.0 to 1.0), and the plug-in replies with the color. The gradient preview service then draws the row or column in that color. By designing the services this way, multiple plug-ins can grab them and use them with a minimum of effort.

Only confirm destructive actions, and always confirm destructive actions. This final guideline may be less applicable to LightWave than it is elsewhere, but it's one of my favorites, and I still feel it's important enough to mention. Better yet, don't make any actions so destructive that the user can't re-create the lost information quickly. But if you do have any such destructive options for the user, only confirm those options. Do not confirm every operation. If the user gets into the habit of clicking "yes" every time he does some mundane little task, he will also be in the habit of clicking "yes" when you ask him, "do you want me to erase every file on your hard drive?"

These are some of the important rules to follow when developing plug-ins for LightWave 5.6. Adhere to them, and your plug-in will be much friendlier to LightWave users.

Brenden Mecleary watches nothing but The History Channel *these days, and is totally stoked about meeting a really nice girl in Japan last month. E-mail LightWave comments, questions, and donations to bman2@ix.netcom.com.*

Texturing Switch A. Roo

By Kim Oravecz

Switch A. Roo is a character I created as a demo reel project. He's the little guy who lives in your refrigerator and turns the light on and off for you when you open and close the refrigerator door. You don't normally see him because when the light comes on he becomes invisible. In this case study, I'll describe the techniques I used to create this character's skin textures.

Basic Skin Texture

The first thing I did was to go in search of a good skin texture. I knew I wanted the skin to look tough and leathery, because he does live in a cold environment. I have Sherry London's book, Photoshop Textures Magic, which proved invaluable for this. This book has many rock textures that were well suited for Switch's skin.

The skin texture is basically a 4-part texture: 2 color maps and 2 bump maps, as shown in Figure 1. The first color map, skin-color-1, is a variation of the rocks texture in the book with some variations that I made; I just wanted to use the color portion of the texture. I made the second color texture, skin-color-2, with a Clouds filter in Photoshop, using orange for the foreground color and a very light beige for the background color.

I created the first bump map, skin-bump-1, by following the first few steps of the cobblestone texture from Photoshop Textures Magic. I created the second bump map, skin-bump-2, by following the first couple of steps for the stucco texture in the same book.

I applied all image maps in each texture channel with cubic mapping. This mapping enables you to apply a patterned texture to the surfaces without seams showing where the surfaces meet.

In the Color channel, the underlying surface color is a Caucasian flesh tone color with RGB values 220, 194, 180. I applied skin-color-2 with 40% opacity in layer 1, and skin-color-1 with 30% opacity in layer 2.

In the Diffuse channel, I applied skin-color-2 with 10% opacity in layer 1, skin-bump-1 with 20% opacity in layer 2, and skin-bump-2 with 7% opacity in layer 3.

In the Bump map channel, I applied skin-bump-1 with 40% opacity and 50% texture amplitude in layer 1, and skin-bump-2 with 40% opacity and 50% texture amplitude in layer 2.

In the Specular channel, I applied skin-bump-1 with 12% opacity and low glossiness in layer 1, and skin-bump-2 with 7% opacity and Low glossiness in layer 2.

I had read about using all planar mapping to prevent image smearing in the books 3D Creature Workshop by Bill Fleming and Photoshop 5 3D Textures by Geoffrey Smith. So I decided to try this method for myself. I split up my character's surfacing based on the direction the polygons were facing. For

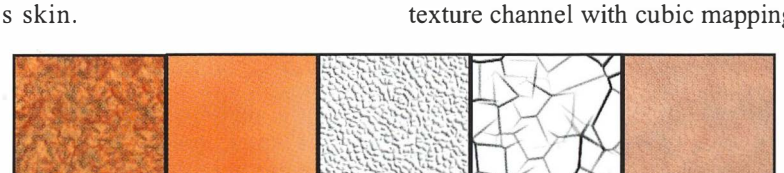


Figure 1: From left: Skin-color-1, Skin-color-2, Skin-bump-1, Skin-bump-2, and combined skin texture.

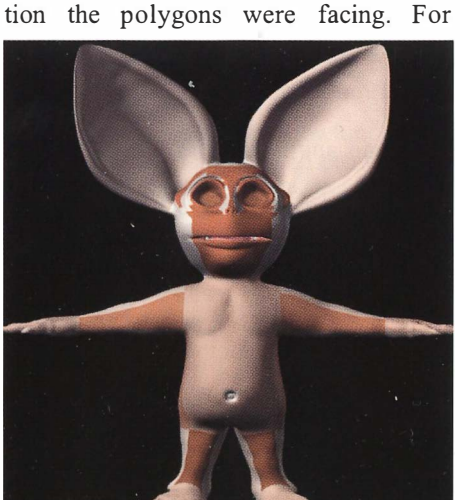


Figure 2: High-resolution front rendering of Switch A. Roo in neutral pose.

example, instead of having one surface for the torso and wrapping the texture maps cylindrically, I split up the surfacing into front, left side, right side and back. I did the same for the arms, legs and head. For the feet and hands I created only a top and bottom surface. Because the ears are translucent, they have only one surface that projects completely through.

Creating Map Templates

For the rest of this case study, I'll use the image map for the face as an example. In order to create a template of each texture surface, I rendered a very high-resolution image of my character in its neutral pose from the front (Figure 2), back, sides, top and bottom.

I then broke the rendered images down into the individual surface areas to be used as templates in Photoshop. I brought each image into Photoshop, then cropped the image to the exact edges of each surface area. Creating individual surface maps this way enables you to use Automatic Sizing in Layout for the texture size. I saved the image files as .psd files, using the surface name as the filename to make it easy on myself. I then used Undo to get the full uncropped image back, cropped the next surface area, saved, etc., until I had saved out all the surface templates.

In Modeler, I loaded the Switch object. I isolated each surface by selecting the desired polygons and hiding the rest of the polygons. I expanded the view of that surface to take up the whole screen in Modeler, as shown in Figure 3, and then hit the Print Screen key. This copies the current screen image into the clipboard buffer.

Next, I went back to Photoshop. At the bottom of the screen on Photoshop's status bar, the message "Importing clipboard" was displayed. Photoshop knows when there is something on the clipboard that you may want to bring into Photoshop. I selected the File|New menu option. In the image size boxes, Photoshop has automatically filled in the size of your screen. Photoshop assumes you will be pasting the contents of the clipboard into a file, so it assumes the size of the image of the clipboard; that's pretty handy.

My next step was to crop the wireframe image to the edges of the surface. Then I held down the shift key, clicked on the wireframe layer in the layers palette, and dragged that layer over to the cropped shaded image file. When I let go of the mouse button and the shift key, the image was perfectly centered in the layer. Then I used the EDIT->TRANSFORM->SCALE menu option to bring the wireframe up to the same size as the shaded surface layer. At this point I had a Photoshop layered image with 2 layers: the flat shaded rendering from Layout, and the wireframe screenshot from Modeler.

I then created a couple of blank layers on top of those two, one layer for the color texture and one for the wrinkles (to be used as a bump map). One of the nice things about using Photoshop layers is that you can create all of the maps for a surface in one file, then just save each layer separately as an IFF file for use in Layout.

Painting Maps

I painted details for each surface on transparent Photoshop layers so I could see the wireframe and shaded layers underneath to use as a guide. First, I had to take into consideration that Switch lives in a refrigerator, a cold environment. I determined which parts of his face would have a reddish color because of the cold: his chin, nose, the eyebrow area above his eyes, the flaps of skin in front of his ears, and his cheeks. Since his skin has an overall orange tint to it, I made those areas a red-orange color. I also thought Switch probably doesn't get much deep sleep, having to be alert at all times for someone to open the refrigerator door. I thought he should have some dark circles under his eyes, so I made that area a gray-purple color. Then I made the eyelids a yellowish tinted color; in looking at my own eyelids, I noticed that the skin coloring was lighter in that area.

I saved the results as a .psd file to maintain the layers. I then made only the color layer visible, flattened the image,

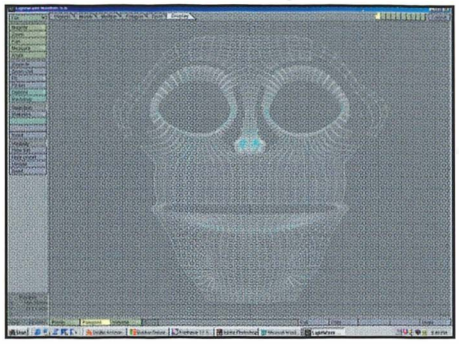


Figure 3: Screen shot of Switch face surface zoomed to fill the Modeler screen.

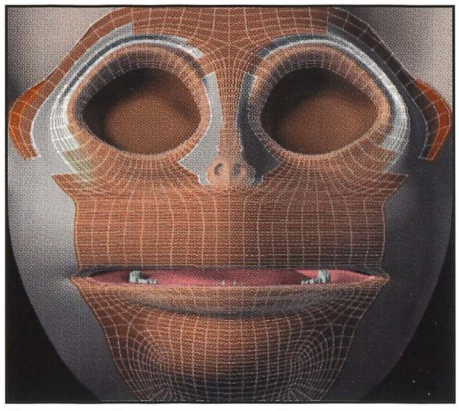


Figure 4: Shaded and wireframe face surface layers in Photoshop.

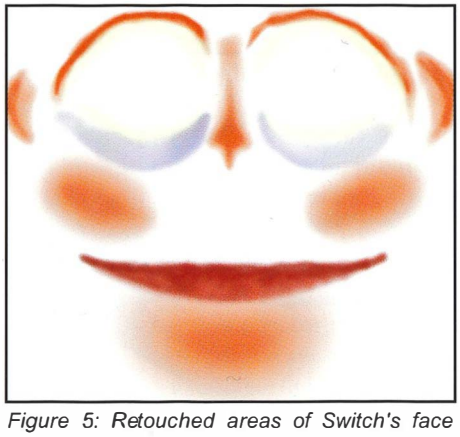


Figure 5: Retouched areas of Switch's face surface.

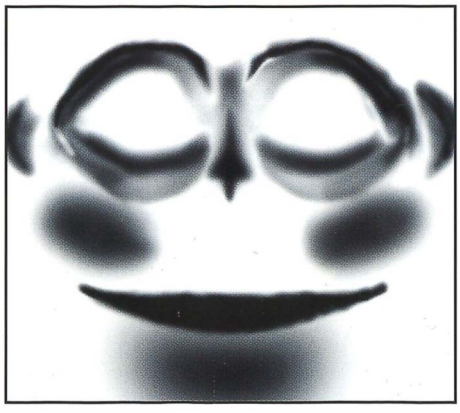


Figure 6: Alpha map for retouched areas of Switch's face surface.

Figure 7: Wrinkle map for Switch's face surface.

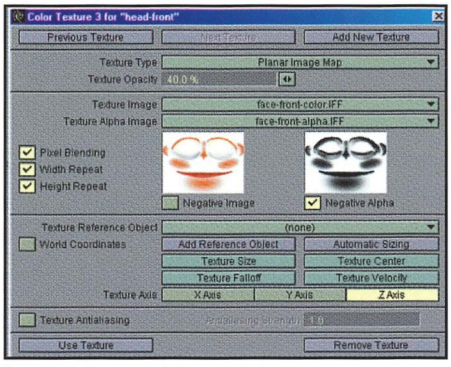


Figure 8: Color Texture panel for Switch's face surface.

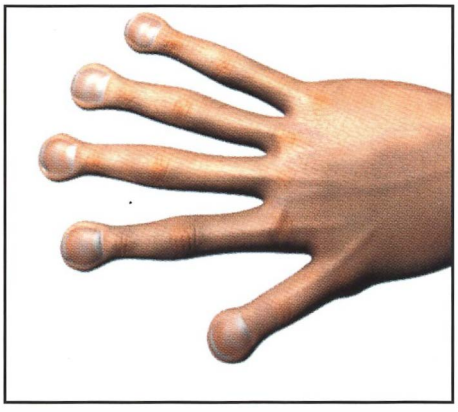


Figure 9: Bump maps for veins and tendons in hands and feet.

Figure 10: Transparency map for ears.

and saved that as an IFF file (I'm used to working with IFF files from my Amiga days - they are more memory efficient than tiffs). When you flatten a multi-layer Photoshop image, what was once transparent turns white. If I used this image file as-is in Layout, the white areas would obscure the nice skin texturing I applied earlier; Switch's face would be all white and he would look like a mime. I needed an alpha image so all that would show through on the object would be the areas that I just painted.

I undid the Flatten Image command in Photoshop to get my layers back. I duplicated the color texture I had just painted by choosing the Duplicate Layer option from the Layers menu. I named the new layer Alpha. (By the way, I recommend that you name your layers in Photoshop, just to make your life easier when you go back to edit a texture. Trust me; I learned the hard way!) Now I needed to make all the colored areas black. I desaturated the Alpha layer to make it strictly grayscale, Image|Adjust|Desaturate. Then I selected the surrounding transparent area with a Color Range fuzziness setting between 100 and 150. Then I chose Select|Inverse to select the gray/black areas. Executing an Edit|Fill and selecting black finished the alpha map, as shown in Figure 6.

I added a new layer to the file and created a layer of wrinkles. This was very easy to do. Again using the shaded view of my surface in the background layer, I painted wrinkles on his forehead, under his eyes, a crease running from the bottom edges of his nose down to the corners of his mouth, a set of wrinkles near the corners of his mouth (laugh lines, I believe they are called) and the wrinkle lines on his bottom lip. Again, I saved the file in layers, flattened it with only the wrinkle layer showing, and saved that as an IFF file as shown in Figure 7.

Applying Maps

My next step was to apply the maps in Layout. I had already applied the basic skin texture to all of the character's surfaces. Now I needed to add the color detail layers on top of that. In the Surfaces panel for the face texture, I clicked on the T button next to the surface color, and at the top of the Color Texture panel I clicked on the Next Texture button twice. I clicked on the Add Texture button and loaded the face color texture image as a planar image map, clicking on Automatic Sizing and applying it on the Z-axis.

I added a Texture Alpha image and loaded up the face alpha map (the black and white image map) that I created. With an alpha map in LightWave, whatever is white is allowed to show through and whatever areas are black are blocked out from showing. Because I made my alpha map black on white instead of white on black (I work better that way for some reason), I checked the Negative Alpha button. I used a texture opacity of 40%. My Color Texture panel looked like Figure 8.

The final stage was to apply the wrinkles. In the Surface panel, I clicked on the T button next to Bumpmap, and again clicked twice on Next Texture and then clicked on Add Texture to add a third layer of bump mapping. This was for the wrinkle texture that I created. I experimented with the opacity and texture amplitude settings, and finally settled on a texture opacity of 100% and a texture amplitude of 120%.

That did it for the face. I went through the above steps for each surface on my character. The ears, hands, and feet also had some extra bump maps for the veins and tendons, Figure 9.

The ears also had a transparency map to make them slightly translucent, Figure 10. I really enjoyed working on this project; the modeling and texture mapping was challenging and a great learning experience!

Kim Oravecz is a Digital Printing Technician by day and a 3D junkie by night. You can reach her by e-mail at kimo@en.com or visit her 'hopes to be finished one day' website at www.en.com/users/kimo.

Building Your Own Video Toaster NT Workstation

by Blaine Holm

So you want to build a Toaster workstation. If you already have the skills to build a computer, and if you follow some simple precautions, you can build the NewTek Video Toaster Workstation of your dreams. However, if the acronym ATX sounds like an off-road vehicle to you, then perhaps you should leave the system building to the professionals. The best place to get a Toaster Workstation is to buy a turnkey system from one of NewTek's authorized dealers. We have the experience with all of the installation scenarios, and have already pulled out clumps of hair along the way so that you won't have to. You can find an authorized reseller in your area by logging on to www.newtek.com/sales/us_canada.html. However, there are those of you who thrive on challenges, and may have lots of hair waiting to be pulled out. This article is intended to be a guide to solutions for common problems you may encounter during installation. It is not intended to be a step-by-step guide to building a computer; the Windows NT installation issues alone could fill this entire magazine.

Better Safe Than Sorry

Let's go over some basic safety precautions you must take when working on computer systems. First of all, never plug in the power cable when the cover is removed. This sounds obvious, but even the most seasoned veteran can relate the story of 'dropping the screw that fried the board.' The voltages can be present on the motherboard and power supply even when the power switch is turned off. On some systems, if you add a PCI card with power applied to the power supply, the system will turn on. So for your sake, and your computer's sake, leave the power cable unplugged.

In addition to protecting yourself, you must protect your components from static discharge. The best way to do this is with a static strap that is grounded. If you don't have a static strap, then make sure you touch something that is grounded before handling any of the components. Never touch any of the chips that are on the circuit board, and never touch the gold connectors on the edge of the card.

Be careful of sharp edges on cases. Some cases are not finished properly along the edges and can be very sharp.

Parts Is Parts

Your Toaster assembly toolkit should include (at minimum) a Phillips screwdriver, 1/8 and 1/4-inch nut drivers, electrical tape, wire cutters, blank diskettes, and tie wraps. The selection of what other components you will use may be the most important decision that you make on your road to Toaster bliss, so make your decisions informed ones. NewTek has a list of approved hardware, and we keep a copy of that list at www.videohardware.com. In order to maintain your sanity, try to stick to the list. Just keep in mind that this is a workstation, not an e-machine, so don't skimp on the components. Don't expect to build a stable system from components bought at a weekend computer show.

Try to buy lifetime warranty memory and retail pack CPUs. The retail packs are not pulled from a machine and have three-year warranties. Speed Razor, AuraVT, and LightWaveVT all benefit tremendously with dual processors, so if your budget allows it, you should consider it. You will need at least a PIII-450 with 128 MB of RAM to get started. Add as much RAM as you can afford. 256MB is nice, but 512MB is better. The faster the CPU the better, and two 450MHZ PIIIs are better than one 500 MHz PIII because of the multi-threading capabilities of all of the software. I've even heard of dual Athlon motherboards in the works.

The NewTek compatibility list only shows a few selections for motherboards. For your sake, stick to the list, even though others have had success with boards not on the list, unless a dealer is configuring it for you. It helps to use approved hardware if you need to get technical support from NewTek. When you call NewTek for support, you are getting some of the best in the business. You have to be clear about what is in your system in order for them to help you. They do not have the advantage of being there in person. That's why it's best to work with your dealer so that they can help iron out troubles that you may have. Some of the selections for motherboards include the Tyan Tiger 100, A-Bit BH6, and the Tyan Thunderbolt. Others have reported success with boards from Super Micro and even some Athlon boards. You may be wondering where all of the new motherboards are. Intel has been having some troubles with their new memory scheme and problems with most of the new chip sets. There are no dual boards available yet that can accept the higher end 733 and 800 MHz Coppermine CPUs, but I hope they will be here by the time you read this. There are plenty of single CPU boards that accept the newer CPU offerings.

A full tower case with plenty of extra cooling is the way to go with for a system of this intensity. Go for the good ones, not the $30 cases. A good power supply is part of the case, and you'll get what you pay for if you try to go cheap. One of the ways to judge the quality of a case is to look for phrases like "solid steel" or "server quality." Make sure the power supply is at least 300 watts or better, and that your case has enough drive bays to hold all of the drives that you plan to install. Install plenty of fans to keep all those circuit boards and drives cool.

I'm Hungry

For mass storage, s complete SCSI-based system will the fastest and the most expensive. IDE drives are fine for use as system and audio drives, with some limitations when used as video drives. Pick a system drive that is as large as you can afford. 20GB is a nice size for a system drive. The audio drive can be 4 or 8 GB. At

22 MBs per second, the Toaster eats up hard drive space like a hungry black bear. Ultra ATA66 is the cheapest way to go by far. Four ATA66 drives combined with 3Ware's 3w-1400 will give you more than enough speed to sustain the required 22 MBs per second. The main limitations of ATA66 include the fact that the cables are restricted to 18 inches, and adding additional storage is difficult. There are probably other ATA66 controllers that would work as well.

Internal or external SCSI would be the next choice. Simply hook up three Seagate Barracuda U2Ws to a U2W controller like Adaptec's 2940 U2W, stripe the drives together in Windows NT, and off you go. Three 50GB Barracudas will yield about 2 hours of storage. We have been testing Ultral60, and we have attained nearly 55 MBs per second with only 3 drives.

The third option is to use a Medea VideoRaid SCSI or VideoRAID RT. The four-drive model, the VideoRAID SCSI, will work on a UW or U2W controller and provides 36 MBs per second sustained while taking up only one SCSI ID. The VideoRAID RT sustains 55 MBs per second, more than enough for any possible dual-stream upgrades. The Medea VideoRAID RTs and VideoRAID SCSIs have 5-year warranties. One of my favorite features is the ability to 'sneaker net' these drives from computer to computer with no hassles. Medea has a great reputation for quality, and they stand by what they sell with some of the best support in the industry.

Sight And Sound

As far as monitors go, the bigger the better, within reason. Two 19-inch monitors will usually be better than one 21-inch monitor. The Matrox G400 Dual Head is the one card that is approved for use with the Toaster that allows for dual monitors. How about running Aura on one screen and Razor on the other? The Diamond Viper V770 works, as do other cards based on TNT/TNT-2 chipsets. Just make sure that you use NVIDIA's reference drivers, which you can find at http://www.nvidia.com. Three new cards from Elsa, including the new Synergy Force, were recently approved. OpenGL cards like the Oxygen series or FireGL do not work well with the ToasterVision and ToasterScope displays, so if OpenGL acceleration is what you need for LightWave, you'll have to live without those Toaster displays for now.

Save yourself a lot of potential trouble and get a LynxOne card or Antex studio card for your audio requirements. These cards have far fewer potential sync problems than the SoundBlaster cards. They also have professional XLR connectors, making interfacing to professional audio equipment quick and painless. If you do not use a lot of talking head shots, and you are willing to wait for the Toaster On-Board audio connections to be activated, then just get a SoundBlaster Ensoniq for now and upgrade later.

Let's Make Toast

Now that you've pre-selected the components, fed the fish, and said goodbye to your family for about three days, you are ready to begin. Lay out your work area and get all of your tools and disks within reach, and begin assembly of your PC. While going into actual assembly is beyond the scope of this article, look for some tips on our website at www.videohardware.com. Remember all of the safety precautions we outlined at the beginning of this article. Use common sense when assembling your system, and make sure all of your cables are secure.

The Toaster card needs to be in a bus-mastering slot. In the Tyan Tiger 100, a good slot to pick is Slot 2, the second one down from the AGP port. NewTek recommends installing the sound card next to the Toaster, so put the sound card in Slot 3. Then install your SCSI or U66 controller in Slot 4, and add a network card in Slot 5 (if available), as shown in Figure 1. Install a separate hard drive for your audio; it can be either SCSI (on a different chain than video), or install an extra IDE drive on the secondary motherboard controller. Check all of your connections, install the cover, plug in the power and turn it on.

It's A Software Thing

One of the following three things happened when you turned your computer on: nothing, billowing smoke, or a beep and a BIOS POST (Power On Self Test) SCREEN. If one of the first two scenarios occurred, drop back and punt, and check over your work. If you've gotten any kind of screen, then you are all set. Enter your BIOS, and set certain items specifically for the Toaster. You may need to select other options for your specific hardware.

BIOS items that need to be set for the Toaster:

1. Enable System BIOS shadow, and Video BIOS shadow

2. Disable ALL power management

3. Answer "no" to Plug-n-Play OS

4. Assign an IRQ to VGA

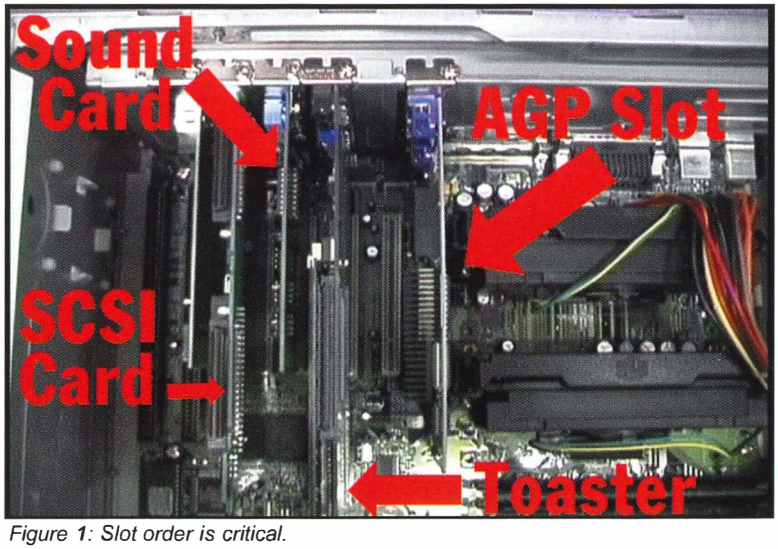


Figure 1: Slot order is critical.

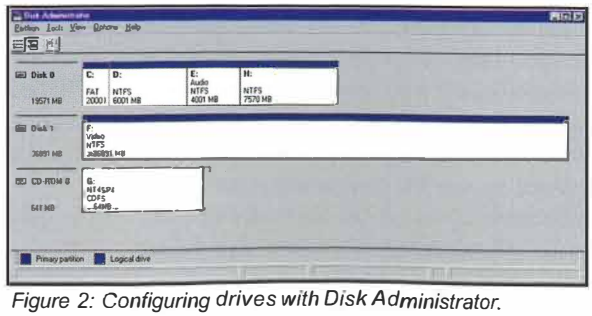


Figure 2: Configuring drives with Disk Administrator.

5. Init AGP port first, (if using an AGP card)

Next, you will be ready to install Windows NT. After you have Windows NT Workstation 4.0 installed (Windows 2000, soon), install Service Pack 4 and then Service Pack 5. Some people have reported success with Service Pack 6, but we found a conflict with Matrox G400 drivers.

Make sure you format all of your other partitions using NTFS. Run Disk Administrator and configure your drives, Figure 2. Aura loves RAM, and when it runs out, it loves disk space. Leave a large partition for Aura, preferably 8GB or better for Aura's temp file. You can even partition part of your video drives for a super fast Aura temp file.

Install your video drivers, then your sound card drivers. If you are using a TNT or TNT-2 based card such as a Diamond Viper V770, then make sure you use the reference drivers found on NVIDIA's website. If you are using the Matrox G400 video card, install the latest drivers found on Matrox's web site. After installing the sound card drivers, you must adjust the priority of codecs, Figure 3. This is detailed in the Speed Razor manual on page 8.

Finally, you are ready to install your Toaster software. After that is complete, download and install the Toaster 1.03 patch, or check http://www.newtek.com for the latest patch. Install the content so you can marvel at Digital Beta shots of the Riverwalk in San Antonio, and you'll have some clips for testing playback. Make sure you install the content to your video drive.

The last thing you need to do is set up the virtual memory, Figure 4. According to the Speed Razor manual, set up a virtual memory file, on the C: drive only, that is 4MB less than your physical RAM. 512MB Ram systems should have virtual memory file size of 508MB. This is detailed on page 6 of the Speed Razor manual.

If you choose to use an IDE drive for audio, you will need to enable DMA for that drive. Make sure you have a rescue disk, and then use dmacheck.exe (found on the Microsoft SP 4 CD, or available for download) to enable DMA playback on your drives, Figure 5. Make sure the audio drive is on its own channel, since some CD-ROMS are not UDMA capable.

At this point, you may want to test the system. After your last reboot, you should be ready to go. First, test your drives to see if they can keep up with the required 22MB per second. You can do this by copying the disktest.exe program found in VideoToaster/Programs/Common_Support folder. Paste it on to a drive that you wish to test and double-click it, Figure 6. You should redirect output to a file so that you may look at it later. If the test passes, it's time to fire up Speed Razor. If it does not pass, you will need to find out why. The reasons can include bad cabling, incorrectly configured drivers, not enough drives, improper termination, etc., etc.

You should set the system up with one video source coming in, and a program monitor on a table. Experiment to make sure things are functional. The final software installation should be reserved for installing your plug-ins like Boris Effects and Power CG. After you make sure you can perform captures, you can move the system into your suite.

After you have started Speed Razor, you will be asked for a serial number. The

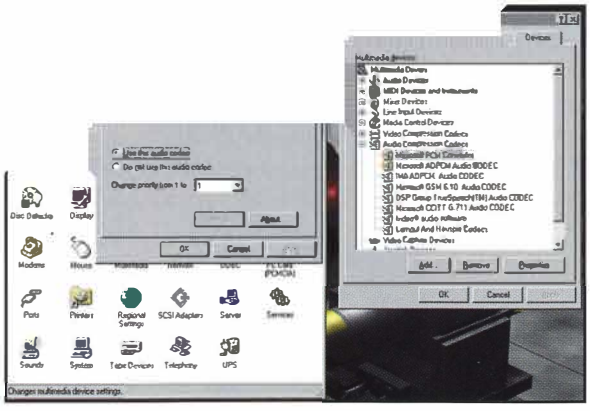


Figure 3: Adjust the audio codec priority.

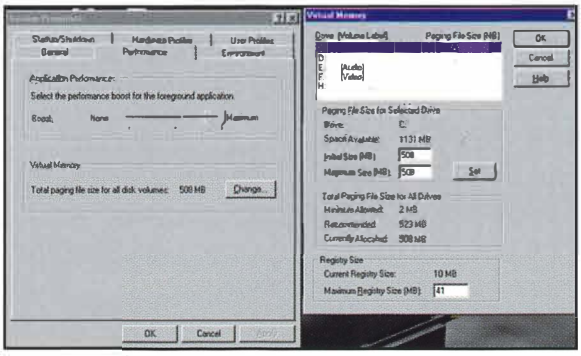


Figure 4: Configuring virtual memory in System Properties.

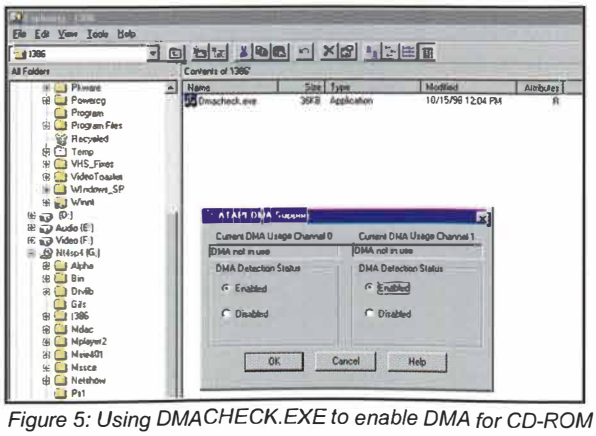


Figure 5: Using DMACHECK.EXE to enable DMA for CD-ROM drives.

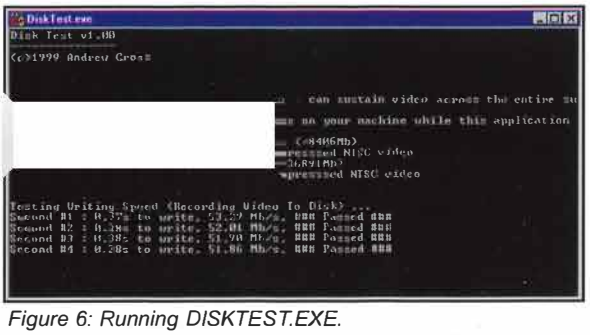


Figure 6: Running DISKTEST.EXE.

Figure 7: Remove all entries from Video Finals except the video drives.

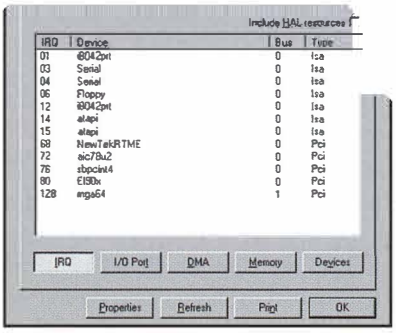


Figure 8: Checking IRQ settings with WinNT Diagnostics.

Figure 9: Input and Output settings configured in Speed Razor.

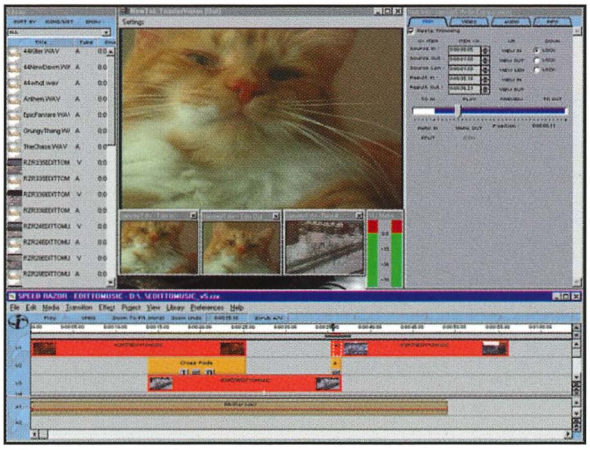


Figure 10: Up and running.

number can be found on the back of the manual. The very first thing you need to do is change the directories that Speed Razor uses to store files. Under Preferences, select Directories. Then remove all entries from Video Finals except your video drives, Figure 7. Then do the same thing for the audio drive. Now you can either check playback if you installed the content clips, or jump right in and capture some of your own video footage. Make sure you create a NEW PROJECT before capturing so the clips go to a designated directory.

When you start Aura for the first time, go to EDIT/SETTINGS/TEMP FILES and select the Aura temp partition you created when formatting all of your drives. Quit and restart Aura to save the changes, making sure you have "save config" checked before exiting. After restarting Aura, set your preview to VT Toaster, select config, and then select your video drive as the temp directory.

Burnt Toast

With a system of this type there are lots of things that can cause big problems. They are usually easy to find with a bit of patience. One common cause is IRQ problems. If you seem to be getting lots of blue screens, check out all of your configuration settings, and make sure there are no IRQ conflicts. You can usually see what IRQ each device is set for by looking at the setup screen as the computer boots. There are also ways to check this in Windows NT, Figure 8. Drivers can also cause problems, so make sure you monitor www.videohardware.com and the mailing lists for the latest news and compatibility issues.

On Tyan Thunderbolt motherboards, if you are using a composite source you may notice noise in the picture. You can fix this by selecting a different filter setting under Output settings. You can access this from Speed Razor, or by running the VT Director program, which puts an icon in the systray. Double click that icon (bottom right-hand corner) and you'll have access to all your input and output settings, Figure 9.

A great resource for Windows NT related questions can be found at www.ntfaq.com, or send us an email at support@videohardware.com, and we'll try to help you. If you call NewTek support, help them out by having a complete list of your equipment, driver revisions, symptom descriptions, and the details surrounding the failure or problem.

As I stated at the beginning of this article, the best way to insure no headaches and a reliable system is to buy a turnkey system from a qualified NewTek authorized reseller. We have the experience with this system to keep you running day after day, and most of us go way out of our way to insure that our customers are happy. NewTek is lucky to have such a dedicated group of resellers.

The mailing lists and newsgroups are also a great resource for tips and tricks. Links to these can be found at www.newtek.com/support/tech_support_newsgroups_frame.html.

I Love This Thing!

This is an incredibly powerful system that makes me feel the same way when I sit in front of it as I felt when I sat in front of the original Toaster. Aura feels like a high-end paint box. The real time feedback when coupled with the Video Toaster hardware is unmatched in the industry. It's the feeling that you have gotten so much more than you paid for, and that there is nothing you can't do. It's a cool time to be a NewTek customer, and it's only going to get better.

Blaine Holm is President of Video Hardware Services, LLC, a NewTek reseller and a Medea VAR based in Manchester, NH. Video Hardware Services, LLC was formed in 1988 and has become the New England region's most respected reseller of digital video editing products. Blaine can be reached at 603-627-5337 or you can email him at Blaine@videohardware.com.

It's Not Just Like the Real Thing: LightWave Lighting Lies

Take

by Lee Stranahan

I've been writing about LightWave 3D in one publication or another for close to ten years now. I've also spent thousands of hours teaching people how to use LightWave in various classes, seminars, and on instructional videos. I've used every version of LightWave, from .9 to L[6], on Amigas, Macs, Intels and Alphas. Even with that experience, I still feel like I'm learning.

I still read everything about LightWave I can get my hands on. I buy books, watch other people's videotapes, and use the Internet to try to keep up with the latest news and hottest techniques. LightWave is just so damn big, and to really learn it you need to know everything: color theory, mathematics, principles of good composition, computer techniques, physics, real world construction techniques, and on and on.

However, in this decade-long process I've learned to separate the wheat from the chaff. There are a lot of myths out there, and a fair amount of information that's incorrect or just useless. With that in mind, I want to explode one of the big myths. It's something I call the LightWave Lighting Lie.

You've probably read or heard a paragraph that goes something like this: "If you really want to learn about lighting in LightWave, probably the best thing to do is to study a book on traditional photographic or film lighting techniques. Also, study films and learn from the lighting techniques that top cinematographers use. Learning these traditional techniques will help you master the digital techniques."

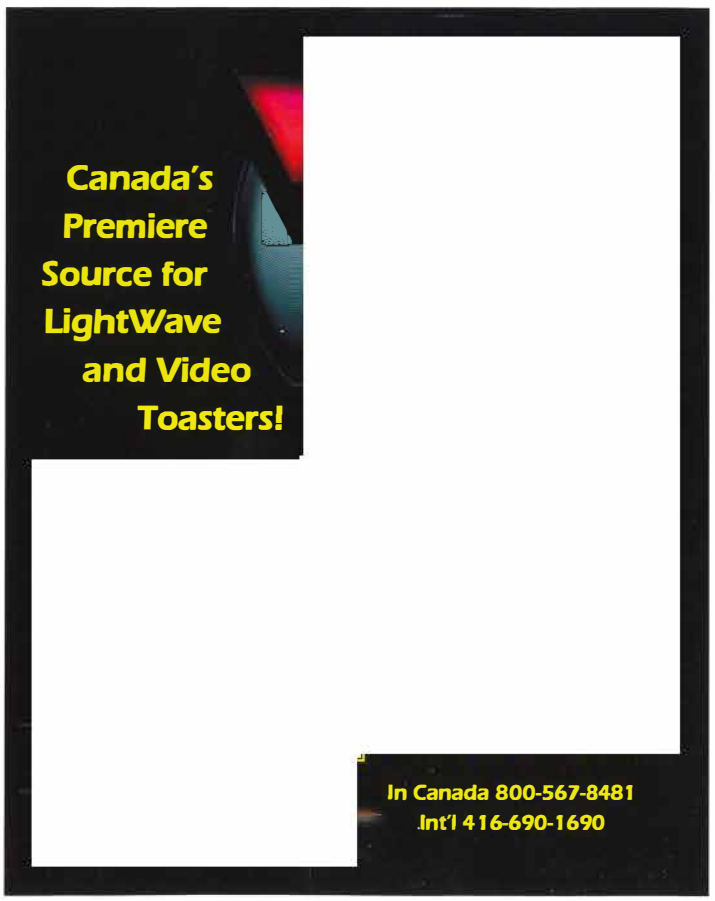
I used to say it myself, but no more. Let me fill in some background. About seven years ago, I bought myself a nice 35mm camera package. In part, I bought it because I wanted to expand my knowledge of LightWave. I got more serious about photography, and I started to focus my work on 'fine art erotic' photography. It's not subject matter for everyone, but I've had a fair amount of success. I've had gallery showings of my work, been published in several books and magazines, and sold a number of prints. I do all my own lighting, and the play of shadows and light are a big part of the work that I do in my still photography. I've also produced a number of projects that were shot on film in the past five years. I didn't act as director of photography on any of them, but watching the DPs and gaffers that I've worked with has been a great education in the real world of film lighting.

Once I started to have real world experience in film lighting, I realized how LightWave lighting is not at all like real lighting. In fact, they are generally worlds apart. Only a few of the principles are the same, and the way things work in practice is totally different. This whole topic is further confused by the fact that LightWave uses some of the language of photography in its interface, and not always in a way that means the same things. So, let's compare and contrast some real world lighting scenarios to the unreal world of LightWave.

Film, Grain, Lights

In the real world, one of the first questions a DP will have is "What kind of film stock are we shooting with?" This is vital information. There are all kinds of different film stocks, and they create different-looking images and have different equipment requirements. One obvious choice is between color and black-and-white film. Another big one is film speed. The 'speed' of a film determines, among other things, how much light the film needs. Film speed is rated by a number called ASA or ISO. Look at any box of film, and it'll say 'ISO 100' or 'ASA 400' somewhere. Usually the stock is named in part for its speed. Guess how fast Agfa's 'APX 400' is? 'Fast' films are films with higher ASA, and they require less light. In my still photography, I shoot all over the range of film speeds. I'll shoot an Agfa 25 ASA film and an Ilford 3200 ASA film in the same session, completely varying my lighting setup to match the stock. I've shot great pictures with the 3200 speed film using nothing but candlelight. For the 25-speed film, I usually have to throw a couple of thousand watts of light to get the image to expose properly. Also, faster film is grainier than slower film.

What do all these film speed considerations have to do with LightWave? Nothing. That's my point: knowing and understanding film speed is vitally, crucially important for a photographer or DP, and practically useless for LightWave artist. There is no film speed in LightWave. Pictures always expose, as long as there is some light in the scene.



There is also no grain in LightWave images. Grain is, of course, a mixed blessing. Well, it's really more like a mixed curse. On one hand, grain is a degradation of the image. On the other hand, it looks cool. Grain is probably the first thing that people think of when they think of the 'film look'. In fact, when compositing real footage with digital images, adding and removing grain can be an important part of the process. Plug-in wizard Steve Worley wrote a Film Grain plug-in that does just that, and it's currently marketed by NewTek, although in a pretty low-key way.

If you want another way simulating all the fun you can have with real film, LightWave [6] includes a cool plug-in from fellow Keyframe writer Rob Gougher called LW_Virtual_Darkroom. It's located in the Image Process panel as an Image Filter. Basically, it simulates the effect of different film speeds, printing papers, and development times. There aren't as many presets as I'd like in the current version, but you can create your own versions of different stocks. The Virtual Darkroom is also very speedy; it seems to add only a few seconds per frame. One possible use (which I haven't had time to try out yet) is to run a sequence of video as a Foreground Image in an empty scene, with the Virtual Darkroom filter turned on. In theory, it would give your video a very nifty film or cinema look, the kind of effect people buy After Effects or Digital Fusion (plus a bunch of expensive plug-ins) to create.

Lights in LightWave are a problem all on their own. I don't know how to break this to you, but get ready for a shock: LightWave isn't real. .

Let's take a quick look at a few of the ways LightWave lights aren't real. First off, there's no 'wattage' for a LightWave light. A light in LightWave is really just a variable in a complex mathematical equation, a topic that Matt Morgan discussed a couple of issues back. In the real world, every light gives off a flare, a glow, and casts shadows. In LightWave, those are all just buttons you can turn on and off. LightWave lights can shine into infinity, across the entire LightWave universe. Until LightWave [6], the falloff algorithm wasn't the same as reality, either. In L[6], you have the option of having lights fall as "Inverse Distance ^2", just like good ol' reality.

So, we've established that LightWave isn't reality. It's cooler than reality, with many more options. However, back in the real world, gaffers use a variety of tools to shape the way light affects a scene. Here are a few examples.

Diffusion

Forget the LightWave use of the term diffusion as a surface attribute for couple of minutes. In the real world, a diffusion is a piece of translucent white material placed in front of a light to change the quality of the light and soften the shadows. Different diffusions have different thickness, and they are called by names such as 'Opal' or '250' or '216'. In practice, the name of the diffusion usually gets written by hand somewhere on the diffusion for easy organization during a busy shoot. The diffusion is usually pinned, clipped, or taped in front of the light, or attached to a large frame mounted on a stand in front of the light. Diffusion is especially important when lighting people. You don't want harsh shadows falling across the face of your lead actress, do you? Trust me, she doesn't want harsh shadows falling across her face.

There's no direct LightWave equivalent for a diffusion. The shadow softness we're talking about here isn't the same as shadow fuzziness for a shadow map; it's about how harsh the shadows are, not how fuzzy the edges are. When your shadows get too harsh in LightWave, you can do tricks with surfaces such as adding a little bit of Luminosity to tone down the shadow, but that can create other problems. You can also do tricks with lights such as adding a clone of a light, lowering the intensity, and then making the clone the shadow-casting light.

Reflectors

Another really important tool, reflectors are anything that you use to 'bounce' light. Often a reflector is just a big white card or piece of foam: not high tech, but boy are they useful. A reflector subtly adds a little hint of light, filling in dark areas and adding detail to areas that shadows have overtaken. Reflectors are often placed very very close to the subject, just out of camera view. Personally, I've done a lot of my figure work lighting with just one light and a couple of reflectors. The single light creates a sense of drama, and the reflectors fill in the rest. If you're wondering about 'three point lighting', the light acts as the key light and the reflectors act as the fill light.

Again, there's no direct LightWave equivalent for reflectors. Oh, sure, you could fake out reflectors in L[6] by turning on radiosity, but why bother? Real world reflectors give you real time feedback: you look, move the reflector in, look in the viewfinder again, and move the reflector if you need to. Radiosity isn't exactly real time, as you may have noticed. A better solution would probably be to add a low intensity point light with falloff. That would give you some real time feedback via open GL, and since you can turn off shadow options you'd have a nice little roving bounce light.

By the way, don't take this as a knock on radiosity. It's one of my favorite new L[6] features, and it definitely adds a whole new level of realism to LightWave's lighting toolkit. I'm just saying that sometimes tricks and cheats are a better way to go.

Cucaloris

Also known as a Cookie, or just a kook, this is a board with holes cut in it. This is put in front of the light, which causes the light to break up into a random pattern. This can look, for instance, like light going through the branches of a tree. Kooks can often be made up by putting some dark tape across a frame, creating a clever little gaffer's invention sometimes called a 'Tapaloris'. You can even put tape across a piece of diffusion, thereby creating a 'Diffusaloris'. These are all very useful lighting tools.

Finally, we have a direct LightWave equivalent! With a Spotlight, you can use a Projection Image. By creating a pattern in Photoshop or Aura, you can simulate a kook. This is great for doing the broken light of a forest or for simulating the effect of sunlight going though a window pane and falling on a wall. You can even use the Projection Image effect with an image sequence, QuickTime movie, or AVI. This lets you create groovy effects like a film actually being projected on a surface.

The problem with Projection Images is that they don't really have the same subtle effects as something like a Diffusaloris. Even creating a low contrast image to project can create some very non-subtle lighting effects. One trick around this is to keep the light levels for projection lights fairly low, and then to use a second cloned light with no projection to smooth out any rough spots.

The Sun

Also known as Sol, it's that big bright thing in the sky. I know that research is important, but don't go out and stare into it. Cinematographers have a love/hate relationship with the Sun. The hate part is that you can't easily control the thing. The love part is that when it's working, the Sun is a pretty great light source. On an overcast day, you get a nice powerful diffused light source. And the hour or so around dusk and dawn, well that's what DPs call the 'Magic Hour'. Crews will often spend most of the day setting up just to shoot during the Magic Hour. That's because the quality of light at that time is really something; you've all seen sunsets. When the Magic Hour hits, watch out; the clock is ticking and there's

work to be done. If you want to see a group of people working their butts off, check out a film set around sunset sometime.

In LightWave, however, time stands still. In fact, a lot of times it moves too slowly. In the real world, the problem is running out of time. In LightWave, the problem is render times. In fact, long render times have proven to be the single leading cause of non-photorealistic lighting. If radiosity, shadows, reflections, and all the other realism tricks didn't add render time, we'd use them almost all the time.

LightWave artists have a lot of tools to simulate sunlight, such as the Skytracer plug-in that allows you to create great looking skies, complete with control over the angle of the sun or moon.

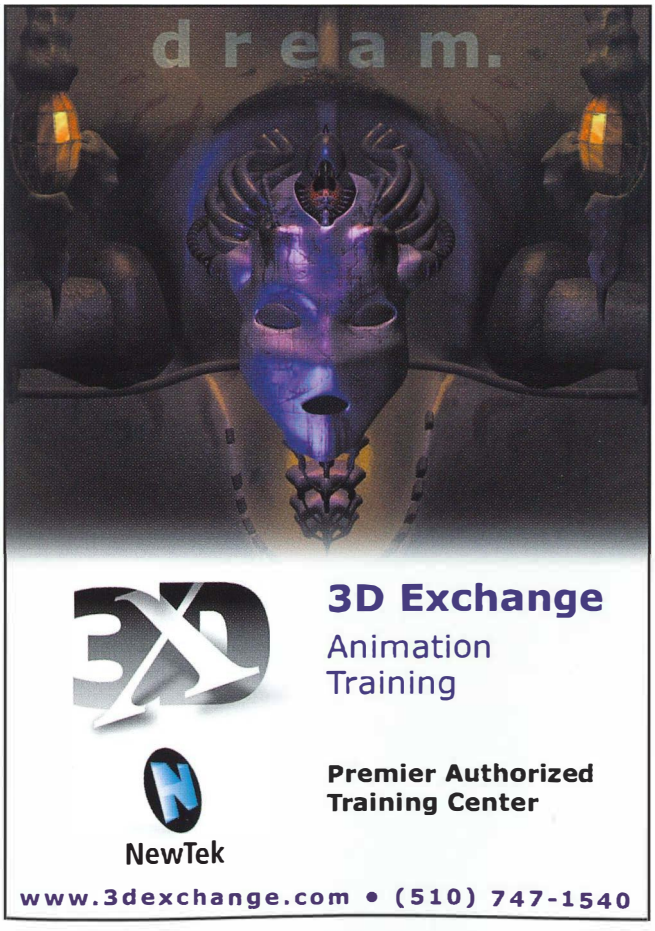
Another great plug-in included with L[6] is Arnie Cachelin's Sun Spot. Select any light, hit the m key to bring up the Motion Options panel, and then select LW_SunSpot from the Add Modifier section. Sun Spot enables you to create the proper angle of the sun for any place on earth, for any time you want, down to the second. First, you enter the date you want to simulate by minute, second, day, month, year. Next, enter the latitude and longitude of the location you want to simulate. If you're not sure of your latitude and longitude, you can use a site like Mapblast.com to enter an address, and you'll automatically get those numbers. (In case you care, I'm at Lat. 34.13 and Long. -118.08; but call before you come over, okay?) Finally, enter the proper time zone and Sun Spot will automagically rotate your light to the proper angle.

Another great feature of Sun Spot is Time Rate, which allows you to do time lapse effects. For instance, let's say you want to simulate ten hours of Sun movement in 2 seconds. Let's assume we're going at NTSC frame rate, so that's 60 frames. (A lot of numbers are coming up, so read slowly and grab hold of the chair.) Ten hours is thirty six thousand seconds. (10 hours x 60 minutes (per hour) x 60 seconds (per minute) = 36,000) If we divide 36,000 (the total number of seconds we're simulating) by 60 (the total number of frames we're simulating that in), we learn that each frame in LightWave will represent 600 seconds of sun movement. Just to make that clearer for our little human brains, that means that each LightWave frame will equal ten minutes (600 seconds, remember) of sun time. Finally, 600 frames times 30 frames per second = 18,000. That's our time rate.

To (I hope) clarify: if we were running at 24 fps (film speed), our time rate would be 14,400, because that's 600 (seconds of sun movement per LightWave frame) times 24 (frames per second). As an alternative, if we wanted each LightWave frame to represent five minutes (or 300 seconds) of sun movement, and if we were running at thirty frames per second, our Frame Rate for Sun Spot would be 9000 because 300 (seconds of sun movement per LightWave frame) times 30 (fps) = 9000.

Got it? Whew. Now go outside, watch the sunset and have a drink. See you next issue.

Lee Stranahan already spent too much time bragging about how cool he is in this article, but you can see his photography on either of his websites www.stranahan.com (the clean stuff) or www.LustOfTheEyes.com (the dirty stuff), and you can see the films he's produced at his company's website, www.HerdOfMavericks.com. He's also working on a series of training tapes on photography, filmmaking, and (of course) LightWave [6]. For more information about Lee's training tapes, seminars, and other classes visit www.LearnLightWave.com



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Messiah Shark Head Setup

by Michael Reiser

Every LightWaver's dream has come true, and its name is Messiah. It is not just a great bone deformation plug-in, it is also packed full of other very useful character animation and special effect plug-ins; it's an entire animation package. Although Fori Owurowa's Puppet Master was (in my opinion) one of the greatest LightWave plug-ins ever made, setting up a character in it was sometimes complicated. Puppet Master has now been rewritten and is living inside Messiah. You won't even recognize it.

This tutorial will explore the new and improved Puppet Master. I will be setting up a shark's head using a combination of the new Messiah Puppet Master as well as some expressions and sliders for precise control of the separate puppet sections.

Allow me take a minute for those who are new to Puppet Master, and explain just what it is that this plug-in does. In Modeler, you cut or 'section' an Anchor Object (the uncut original object) into separate model layers. You save these as individual objects. In Layout (now Messiah), these individual sections are moved to bend and deform the original whole mesh. By using an outside 'cage' Puppet Master bypasses the use of bones. If the classic LightWave bone is an internal deformation system, Puppet Master is an exoskeleton deformation system.

The first step is to make the model. There are some special considerations when making a model to be used in Puppet Master. Here are a few guidelines that I use. I prefer to keep my anchor polygon counts as low as possible. This means Puppet Master has fewer points to move around, and there is less of a chance for any overlapping or non-planar polygons. (Don't worry; Puppet Master and Messiah work hand-in-hand with Metamation.) Modeling as a single mesh can also help. This is not an absolute rule; it can sometimes be limiting, but I find that I have few problems if I follow it. If you are new to Puppet Master I suggest (at least in the beginning) that you keep your models somewhat simple and make them one continuous mesh. When you become more comfortable with the quirks of Puppet Master you can push your models and Messiah to their limits.

Figure 1 is an image of the MetaNURBed version of the model I will use for this Messiah/Puppet Master tutorial. Note that I only modeled the head of the shark. All the techniques that I will be discussing can be used to animate the remainder of the shark as well, but for this tutorial the head and jaws will do nicely.

When you have completed modeling your character, center and save it in Modeler. Copy it to the next layer. Now, just as in the previous versions of Puppet Master, cut up the copied model so you have the various sections in separate layers. Here is a little advice: don't just start cutting away without some thought as to what you are doing. Think about how best to cut up the model so that the sections will move the model most naturally. Take a few minutes to visualize the natural movements of your character. Observe the real life counterpart of your creature or character (if there is one). I went to my local video store and found a few videos on Great Whites for this tutorial. Videos can really help you decide where to break up your model. Not to mention how to animate it! Take a look at the sections I created for the shark, Figure 2.

I broke it up into four separate objects: a base, snout, and upper and lower jaws. After you have pasted the Puppet sections into separate layers, save each (with a descriptive name like lower_jaw.lwo) into the same folder in which the anchor was saved. Before you leave Modeler, open the layer that contains the original anchor object. Make sure that the original model is saved, then apply the MetaForm_Plus plug-in. Set subdivision to 2 and check the Metamation check box. Save the new shark model under a different name like Meta_Shark.lwo.

At this time you may want to take a few minutes to surface the shark. You should now have the anchor, all of its separate sections, and a surfaced metaformed version of the shark all in one folder. Close Modeler.

Figure 1: Shark model.

Figure 2: Shark model sectioned for Puppet Master.

Open Layout and load the shark anchor object. This is the original uncut non-metaformed version of the model. Save the scene as Messiah_Shark.lws. With the shark object selected, open the Objects panel and go to the Displacement Map Plug-in tab. Select the Messiah_Displacer plug-in. In a few seconds the plug-in will appear. Click on the Options button to the right of the plug-in name. Messiah takes a few seconds to launch; be patient. When Messiah opens, your object will be at the center of the Messiah world. Be careful, the loaded object is not the first object selected by Messiah. Do not add any effects just yet. The camera is selected by default and any effects will be placed on the camera. To the left is an item list that contains all of the objects in the scene. Select the low polygon shark, which you want to apply the Puppet Master plug-in to, and click on the Effect tab at the top of the screen. In the Setup sub-tab there is a drop-down list box. Click on it and select the Puppet Master plug-in, Figure 3.

A description of the plug-in will appear. Nothing has happened yet; you still need to actually add the selected effect to the object. With the proper object selected, click on "Add Effect". You should now see in the item list that the Puppet Master plug-in has been added to the object. It should read "Cluster: Puppet Master" as a child of the original object. Now click the Animate tab at the top of the screen. In the Setup sub-tab, click on the Load Cluster Objects button, Figure 4.

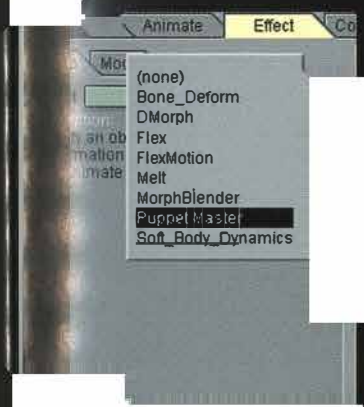


Figure 5: Move, Rotate, Scale and Pivot parameters in the Setup section under the Animate tab.

Locate the [illegible] sections. In the case of our example there are just the four. Hold down the control key and multiple-select the objects. Messiah allows you to load multiple objects at once so you don't have to keep going back and forth. This is a great time saver!

Once the section objects are loaded, you can use Puppet Master. Really, that's it. Puppet Master is ready to go. Simply select the sections you wish to transform from within the item list, and then move them in the view port. This is much better then what you had to go through before. (Thanks, guys!)

When the sections are initially loaded into Layout you will notice that they all rotate around the same pivot point. This happened when the separate sections were saved in Modeler, which uses its center as the pivot point for all saved objects. For this example, these pivot points are unnatural and need to be changed for each section. In the old version of Puppet Master you could adjust the pivot points in Layout; now the sections never even see Layout. Instead, you can adjust the pivot points in Messiah.

Select a Puppet section, such as the snout, and go to the Setup section under the Animate tab. There you will see the separate parameters for Move, Rotate, Scale and Pivot, Figure 5. If you don't see the pivot parameters, hit the F3 key; it took me a few days to find that one! When adjusting the pivot point, Messiah now moves the object relative to the pivot point instead of moving the pivot point itself. The pivot will appear to stay still as you reorient the object. When you are satisfied with the new pivot location, move the puppet section back into its proper position. Do this for each puppet section in the cluster. Because the adjustments were made in Setup, they become the default values of the object.

The puppet sections are originally created as children of the Anchor object as a cluster. In the item list you can see that the individual puppet sections are all children of the cluster, but none of the sections has any relation over the other, Figure 6. This means that if I move the base object none of the other puppet sections will follow. This is not a natural setup. Think about how separate parts of your body move when other parts move; if your head moves, your jaw moves with it. At the same time, your jaw can move without moving your head. In this example your head is the parent of your jaw. This is the kind of setup hierarchy you wish to create.

I chose to have the Body_Shark.lwo as the root object. The root of a hierarchy simply implies that it is first in the chain. If this object moves, the rest will follow. The upper and lower jaw objects will be children of the snout object, which in turn is a child of the root. In order to change the relationship between objects in Messiah, simply click and drag the objects in the item list. When you drag one object over another it will turn blue. When you release the mouse button, the object you dragged will become the child of the object you dragged it over. Using this method you can quickly create parent-child relationships, Figure 7.

When you have rearranged the hierarchy, rotate the snout around. You will see that the upper and lower jaws now rotate with the snout but are independent in their own movements. You can move the entire shark by moving either the whole anchor object or the first puppet section in the parental chain. This is a simple forward kinematics (FK) set up.

With the pivot points and forward kinematics chain set up, you are ready to bring this creature to life. The first, and probably the simplest, way to move and rotate the separate puppet sections of the shark is to use the edit sphere. Select the puppet section you wish to transform, then click and drag a rotation parameter on the edit sphere, Figure 8. This way is very straightforward, and I suggest using it for setting up the rough keyframes of your animation. However, in order to have precise control you will need to use some other tools.

Click and drag up on the time slider that runs across the bottom of Messiah. A graphic representation of the currently selected motion parameter will appear. This graph is always present and ready to use. A lot of people are not aware of it because there is no button or tab to click. It is

Figure 7: hierarchy.

Figure 9: Deactivating excess sliders.

Figure 10: Only the necessary sliders remain.

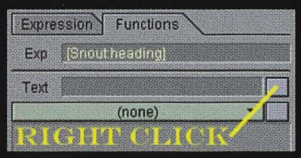


Figure 11: Function tab set to the heading parameter of the Snout object.

Figure 12: Snout pitch channel added in Expression tab.

fast, well set up and very intuitive. Scroll through the different parameters by using the number keys 1-9 or clicking the edit sphere channels. Used in combination with the animate tab, this enables you to graphically see in real time the effects of changing a key's parameters. This is a very powerful way to animate. To create keys, just move the time slider and click Create or simply press the Enter key. You can copy, paste, cut and delete keys as well.

Another method of control over motion involves creating sliders for each of the keys' motion parameters. This may take a little more set up time but is well worth it in the end. The goal is to have a number of well-labeled sliders to provide the animator with the organized tools that will increase his or her workflow and productivity. (That last part is for our bosses; in reality, it is just plan fun!)

Now we will set up a slider for the rotation of the snout object. The first thing you need to do is create the slider. Go to the File tab and click Add Slider. A slider will appear in the main view port. It will have a number of individual sliders that you don't need; here is how to get rid of the extras. Under the Animate Tab > Keys Tab there are a number of colored boxes with check marks next to various motion parameters. You will want to deactivate all of the sliders except heading and pitch by right-clicking on the colored boxes next to the unwanted parameters, Figure 9. Note that the deactivated sliders vanish from the main view port, Figure 10.

Now add the expressions that will control these two parameters. Go to the Command tab and click New Expression, then click the Function tab. Make sure that the heading slider is selected by clicking on the slider itself. The little triangle should turn yellow when active. Now, right click on the gray box next to the Text entry field. The words "[Snout.lwo:heading]" should appear in the Exp_1 window, Figure 11.

Go back to the Expression tab and select the snout object from the Object drop-down list. Make sure that Heading is selected in the channel drop-down list. Click "Add channel". You should now be able to move the slider and see the heading change in real time. You will see that the heading only changes about 45 degrees in one direction. The snout of the shark won't go past 45 degrees anyway, but we need to change the expression so that it reads, "PercentStep([Slider:heading],-1.5,1.5)". Don't forget, the expressions are case sensitive! Now the range of the slider includes zero. When the slider is centered the snout will point straight forward, and with the addition of negative numbers it will turn left as well as right.

Now go through the same steps for the pitch channel, Figure 12. To make it a little more organized you can rename each slider as well as the separate channels. To rename the slider, use the Name command under the File drop-down menu; just remember to hit Enter. To rename the individual channels, select the slider and go to the animate tab. Under the Keys sub-tab, simply type over the existing name in the text field and hit the Enter key.

Try this set up. Open the Animate tab > Keys tab and drag open the motion graph so that about half of the screen is viewport. In the item list, select one of the slider sets. The slider should appear in the viewport. From this setup you now have complete control over the motion of all puppet sections. You have immediate access to the individual keys through the edit sphere, slider, motion graph or the Keys tab; take your pick! Another nice feature: if the anchor object is MetaNURBS compliant in Modeler, it will also be compliant in Messiah. With the anchor selected, hit the tab key. Nice.

At this point, you are ready to keyframe your animation. Because we started in Layout and added the Messiah plug-in to our anchor object, a Linked Scene file was automatically created. Any animation created in Messiah will automatically be updated into Layout. Use the OK button at the bottom of the Messiah interface to exit to Layout. You can get back to Messiah by clicking on the Options tab beside the Messiah plug-in in the Deformation tab for the anchor object. I suggest that you read the Creating and Linking Scenes information found in the Messiah Documentation. For that matter, read the entire thing! It is a great resource.

In Layout, load the metaformed shark you created earlier in Modeler. Apply the MetaTarget plug-in as a deformation to this object. Remember that you used two subdivisions when you originally metaformed this object; set up the options appropriately. Apply the LW MetaShaper plug-in to the anchor shark object as a second deformation plug-in after Messiah. If you have not used Metamation before, please refer to your manuals on how to set up this plug-in. After you have animated the anchor object in Messiah, the animation is brought into Layout, where the Metamation plug-in will smooth out the low-polygon anchor object.

I hope that this little introduction to the new and improved Puppet Master has opened your eyes to some of the incredible powers Messiah has to offer. Don't stop here! Messiah enables the combination of many effects. The best way to learn is by trial and error. So error away, and good luck!

Michael "Doc" Reiser is a Radiology Resident in Pittsburgh, PA. He is co-founder of Pollywog Productions, a 3D animation studio specializing in character design and medical and scientific visualization. He can be reached at MikeReiser@aol.com.

Figure 13: Complete Puppet Master setup for shark head in Messiah.

JURASSIC EYES

Photorealistic Eye Modeling and Texturing

by Bill Fleming with Steve Tubbrit

The eyes give life to a character. Unfortunately, eyes appear to be the bane of most artists. I can't count how many times I've seen a wonderfully modeled and textured human or creature head only to find the eyes were treated as an afterthought. The eyes are the focal point on any character you create, they are the source of all emotion and expression for the character. The viewer instinctively looks to the eyes to bring the character to life. Therefore we must make the eyes our number-one priority when creating our characters.

As you can see in Figure 1, there is a great deal of detail in a human iris, an extraordinarily colored and detailed muscle of the eye. Since an iris is a muscle it has fibers, which make up the texture detail we see. This texture is more than a simple colorful pattern; it's a landscape of peaks and valleys that catch light, which is why the iris is so bright.

There is also a very broad variance between the appearance of human eyes. The same applies to creature and animal eyes; they are very detailed and each eye is as unique as a fingerprint.

The impact of a detailed, photorealistic 3D is best illustrated by looking at how it brings a simple 3D creature to life. In Figure 2 you can see the alien creature Gobbledy-gook™, a comical alien creature from the Komodo Studio project Spam Bandits™. This figure shows the initial texture development of the character. I hadn't started the body texturing at this point, only the eyes were textured. You can see how the eyes have brought him to life, in spite of the simple body surfacing. In fact, you can use photorealistic eyes to add new life to a cartoon character.

Figure 1: The detail of human eyes.

Of course, a photorealistic eye is most effective when applied to a model with detailed surfacing, as seen on the raptor head at the beginning of this article. While the surfacing is certainly detailed, it's the eyes that catch the viewer's attention and really bring the raptor to life. If a simpler eye were used in place of the detailed eye, the raptor would look artificial in spite of the skin texture. The model would end up looking like a museum replica rather than a living, breathing dinosaur. Obviously, the eyes are paramount in developing creatures and characters with life. But how do we create a photorealistic 3D eye? Let's first take a look at the anatomy of the eye.

Figure 2: Bringing a creature to life with detailed eyes.

Anatomy of the Eye 101

The eye is a very detailed and complex object. While we don't need to recreate every little detail of a real eye, we do need to incorporate the relevant attributes that create its outward appearance. Figure 3 is a diagram cutaway of a human eye. There are many elements of the eye, but we'll only explore the major ones.

* Cornea: A transparent external surface that covers both the pupil and the iris. Basically, the cornea transmits and focuses light into the eye. The convex shape of the cornea enables it to grab light from a wider

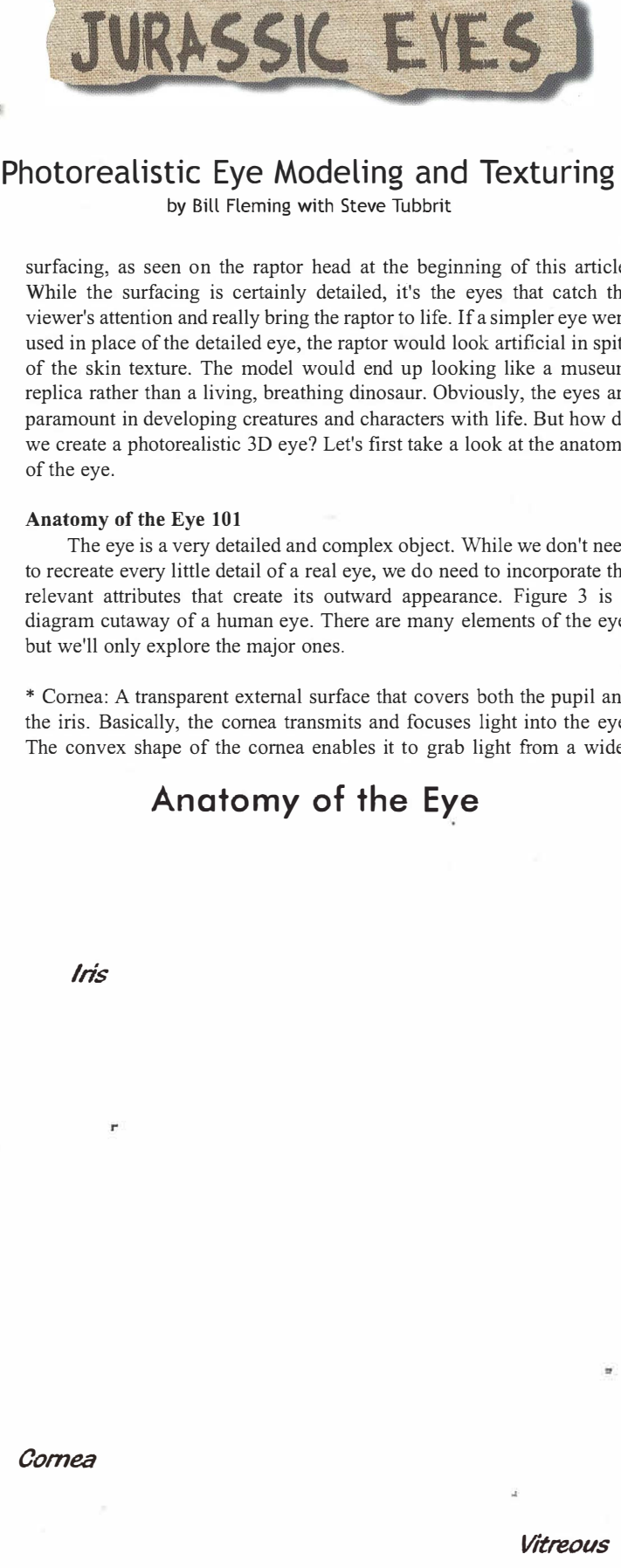


Figure 3: A cutaway of the human eye.

range, extending our peripheral vision. A very thin layer, the conjunctiva, covers the clear cornea.

* Iris: A colored circular muscle, which helps regulate the amount of light that enters the eye by controlling the size of the pupil.

* Pupil: A black-looking aperture that enables light to enter the eye. It appears dark because of the absorbing pigments in the retina. The pupil changes size to accommodate the amount of light that is available.

* Lens: The transparent structure inside the eye, located behind the iris, that focuses light rays onto the retina. Ligaments called zonule fibers, which are attached to the anterior portion of the ciliary body, suspend the lens. The contraction or relaxation of these ligaments as a consequence of ciliary muscle actions changes the shape of the lens, a process called accommodation that enables us to focus a sharp image on the retina.

* Retina: The nerve layer that lines the back of the eye. The retina senses light and creates impulses that are sent through the optic nerve to the brain.

* Optic Nerve: The nerve that carries the impulses formed by the retina to the brain, which interprets them as images. In the center of the retina is the optic nerve, a circular to oval white area measuring about 2 x 1.5 mm across. From the center of the optic nerve radiate the major blood vessels of the retina. Approximately 17 degrees (4.5-5 mm) to the left of the disc, can be seen the slightly oval-shaped, blood vessel-free reddish spot, the fovea, at the center of the macula.

* Macula: A small area in the retina that contains special light-sensitive cells. The macula enables us to see fine details clearly.

* Vitreous: The clear, jelly-like substance that fills the middle of the eye.

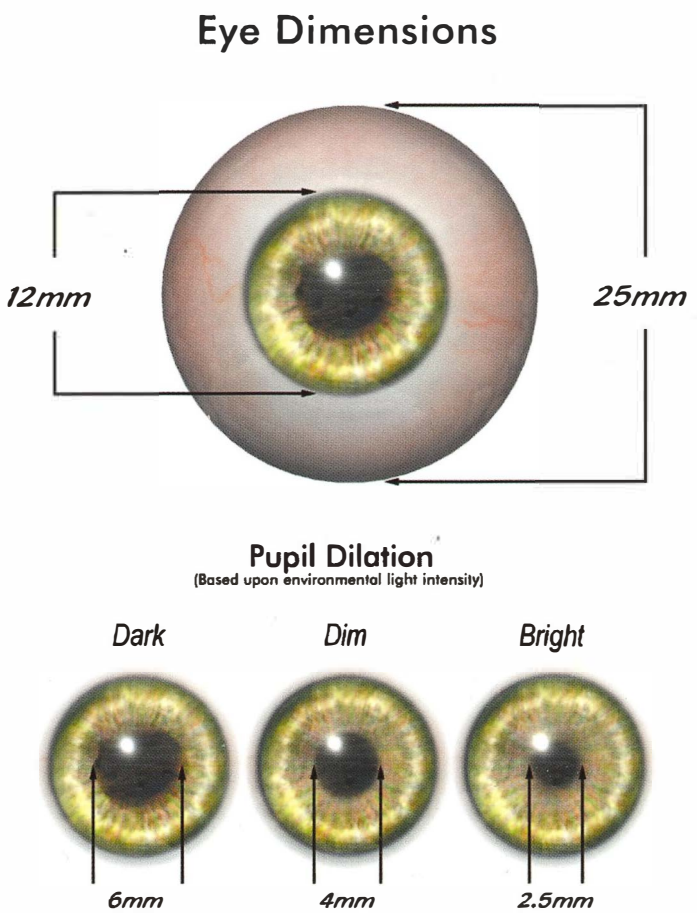


Figure 4: Normal human eye dimensions.

* Sclera: The "white of the eye", which forms part of the supporting wall of the eyeball. The sclera is continuous with the cornea. Furthermore this external covering of the eye is in continuity with the dura of the central nervous system. The wall of the eyeball is a three-layered sandwich. The external layer is formed by the pale, tough sclera and the cornea. The intermediate layer is divided into two parts: Anterior (iris and ciliary body) and posterior choroid (not pictured), which is dark, spongy, and rich in blood vessels. The internal layer, or the sensory part of the eye, is the retina.

* Fluid Chamber: There are three chambers of fluid: Anterior chamber (between cornea and iris), Posterior chamber (between iris, zonule fibers and lens) and the Vitreous chamber (between the lens and the retina). The first two chambers are filled with aqueous humor, and the vitreous chamber is filled with a more viscous fluid, the vitreous humor.

Okay, I think I've bored you enough with the physical side of the eye. Of course, it's always a good idea to understand what you are attempting to create before you make it! While we've covered a lot of technical information on the structure of the eye, the elements that we need to be most concerned with when creating a 3D model are the sclera, iris, pupil and cornea. These are the exterior elements of the eye that are most visible.

Modeling the Raptor Eye

Fortunately when modeling realistic eyes you can get away with modeling only the details the viewer will see, such as the sclera, iris, pupil and cornea. For this tutorial we'll model the raptor's eye. It's basically the same process as modeling a human eye, except we'll modify the shape of the pupil. Eyes can vary a great deal in size, but we'll model to the size of a human eye, which is typically 24-25mm in diameter. Figure 4 shows the dimensions of a normal human eye.

Open Modeler and create a ball with the properties Globe, Sides=40, Segments=20, Center 0,0,0, and all three radii 24mm.

The diameter of the eye is roughly 24mm, while the diameter of the iris is normally half that of the eye, or 12mm. This size can vary by +/- 1-2mm. The pupil is a bit tricky since it changes size depending upon the light. As you can see in Figure 4, a pupil can vary from 6mm in low light to only 2.5mm in bright light. The raptor's pupil is vertical, but the scaling percentages remain constant. You can scale the pupil several ways, but I prefer morphing the model. This produces a more accurate effect, and you don't have to create multiple textures for the model.

Rotate the ball 90 degrees on the X-axis, so the upper "pole" faces forward. We want the ball rotated so we can easily edit the front faces to create the iris and pupil.

Rename the entire surface to "Eye".

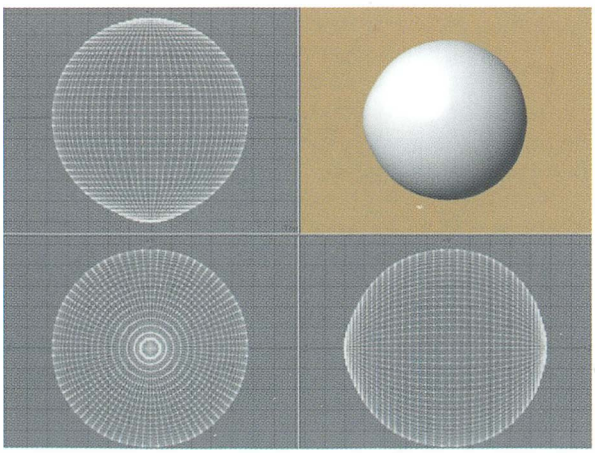


Figure 5: The completed cornea.

Before we edit the eye to add the iris and pupil, we'll need to make a copy of this object to create the cornea. Copy the object to another layer and rename the surface as "CORNEA".

Now let's create the bulge in the front of the cornea. In the cornea layer, select the first two segment rings of polygons on the front of the ball and move them forward, -Z, slightly. Then deselect the outside segment ring and move the remaining segment ring forward again. Finally, select the single 'pole' point in the center and move it back a bit to soften the front of the cornea.

Subdivide/Metaform the ball with a Max Smoothing Angle of 179.0. You should now have a smooth ball with a bump protruding on the front, as shown in Figure 5. You'll notice the polygons around the center point will be a bit jagged due to the subdivision smoothing, but don't worry, they will render perfectly. You can skip the subdivision step if you'd like to reduce the polygons of the cornea, but it will look rather rough on close inspection. Since the eyes are typically separate objects for animation, I like to make them high-resolution so I have the highest quality.

The OpenGL preview shows the cornea from the side so you can see the extent of the protrusion. It may take a bit of tweaking to get the protrusion to be just right. Okay, the cornea is now complete so we can move on to editing the eye.

Switch back to the eye layer. Select the first two segment rings on the front of the ball and move them inward, +Z, to flatten the front of the ball. Now deselect the outer segment ring, and move the inner segment inward again until the front of the eye is completely flat, as seen in Figure 6. This completes the shaping of the iris, which is normally rather flat.

The next step is to pull in the pupil to add depth. In a real eye the pupil is a hole, but for this model a simple indent will suffice. Select the first segment ring of polygons and press Shift-Z to merge them into one polygon, then delete the floating point in the middle.

Select the new polygon. Press B to bring up the BEVEL requester. Bevel the pupil inward a few times, using the following values:

* INSET = .5mm, SHIFT = 0
* INSET = 1mm, SHIFT = -1mm
* INSET = 1mm, SHIFT = -1mm
* INSET = 1mm, SHIFT = -.5mm

Delete the multi-point polygon at the center of the pupil so you can Metaform the object. You could use MetaformPlus, but it's easier to kill the polygon, and it makes no difference on the final rendered eye because the pupil is black anyway.

The next step is to define the iris and pupil surface on the front of the eye. Select the flat polygons on the front of ball, including the pupil, and give it a new surface called "Iris" as seen in Figure 7.

To create a high-resolution model, Subdivide/Metaform the ball with a Max Smoothing Angle of 179.0.

You need to scale up the cornea slightly so it won't intersect the eye. In reality, the cornea is welded directly to the sclera. However, for the purpose of our model it's best to leave them separated for surfacing control. Switch to the cornea layer and Smooth Scale the object with an offset of .1mm.

Select both layers and save the object as human_eye.lwo. You should now have a complete human eye model. Of course, we are supposed to be creating a raptor eye but I thought you should have a human eye, too.

To create the raptor eye, revert back to the low-resolution eye, go to the eye layer, and select the pupil polygons in the center of the iris. Stretch them inward and upward to create a vertical slit as seen in Figure 8. The final step is to Subdivide/Metaform the ball with a Max Smoothing Angle of 179.0. Then select both layers and save the model as raptor_eye.lwo.

Surfacing The Raptor Eye

In Layout, load the raptor_eye.lwo object. Load the seven raptor eye image maps: RaptorEyeC.jpg, RaptorEyeL.jpg, RaptorEyeD.jpg, RaptorEyeS.jpg, RaptorEyeR.jpg, RaptorEyeRef.jpg, RaptorEyeB.jpg, as shown in Figure 9. You can download these image files from the www.keyframemag.com website. The creation of the image maps is paramount to the success of the eye, but we don't have the space to cover the painting techniques in this article so I've provided the image maps for you.

Select the Cornea surface and apply these settings: SURFACE COLOR 128, 128, 128; Luminosity 0; Diffusion 70%; Specular 80%; Glossiness 256; Transparency 90%; Refraction 1.337; and Smoothing ON.

Apply the RaptorEyeRef.jpg image to the Reflectivity attribute as a Planar Image Map on the Z Texture Axis. Be sure to select Automatic Sizing and set the Texture Opacity to 80%. This reflection map applies a subtle reflection to the sclera and a more intense reflection to the iris. The sclera is white so it easily shows a reflection, but the iris is detailed and colorful so it needs a higher level of reflectivity to bring out the luster. You can use the Texture Opacity to vary the intensity of this reflection.

The Refraction Index of the cornea is critical for realism. A value of 1.337 is the actual refraction index of a real eye cornea. Here are the refraction indexes of other eye elements: Anterior Chamber 1.333; Crystalline Lens 1.35-47 (variable); Vitreous 1.333. The only one you need to be concerned with for this eye is the cornea, since the others are hidden in the eye's interior.

The next surface to edit is Eye. The Eye and Iris surfaces have very similar settings, so we'll surface the Eye first, then copy it to the Iris and make the necessary changes. Select the Eye surface and apply the following settings: Surface Color map RaptorEyeC.jpg, Texture Opacity 100%; Luminosity map RaptorEyeL.jpg, Texture Opacity 10%; Diffusion map RaptorEyeD.jpg, Texture Opacity 100%; Specular map RaptorEyeS.jpg, Texture Opacity 100%; Color Highlights, Glossiness 256; Reflectivity map RaptorEyeR.jpg, Texture Opacity 80%; Bump Map

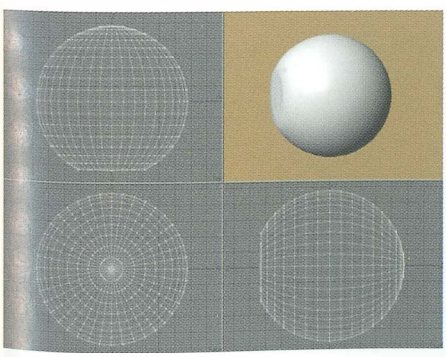


Figure 6: Flattening the iris.

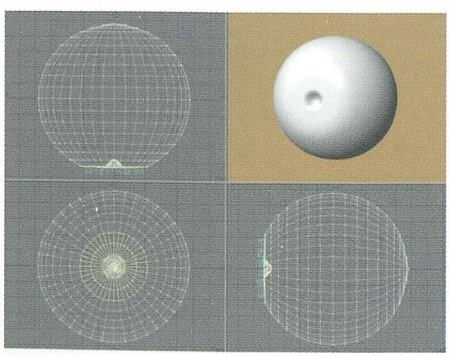


Figure 7: The completed eye.

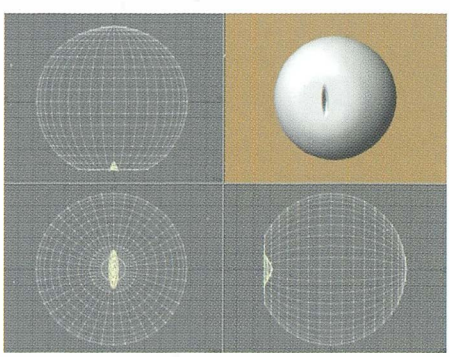


Figure 8: Shaping the raptor pupil.

RaptorEyeB.jpg, Texture Opacity 100%, Texture Amplitude -150%; Smoothing On.

All image maps are Planar Image Maps on the Z Texture Axis and use Automatic Sizing. Texture Antialiasing is disabled for all textures, including the Bump Map. The Luminosity map adds more 'pop' to the iris; this is the Eye surface, but we must use the same settings for Luminosity if the surfaces are seamless.

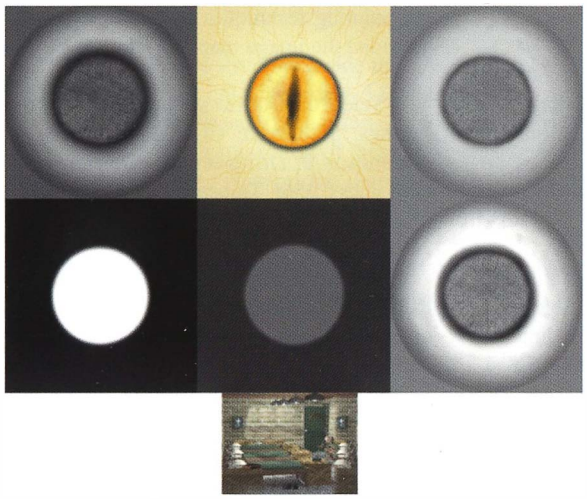


Figure 9: Raptor eye image maps.

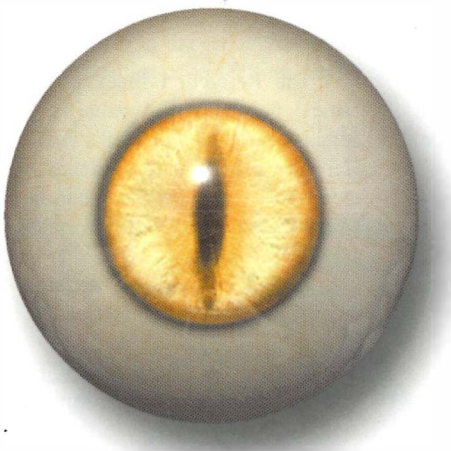


Figure 10: The final raptor eye.

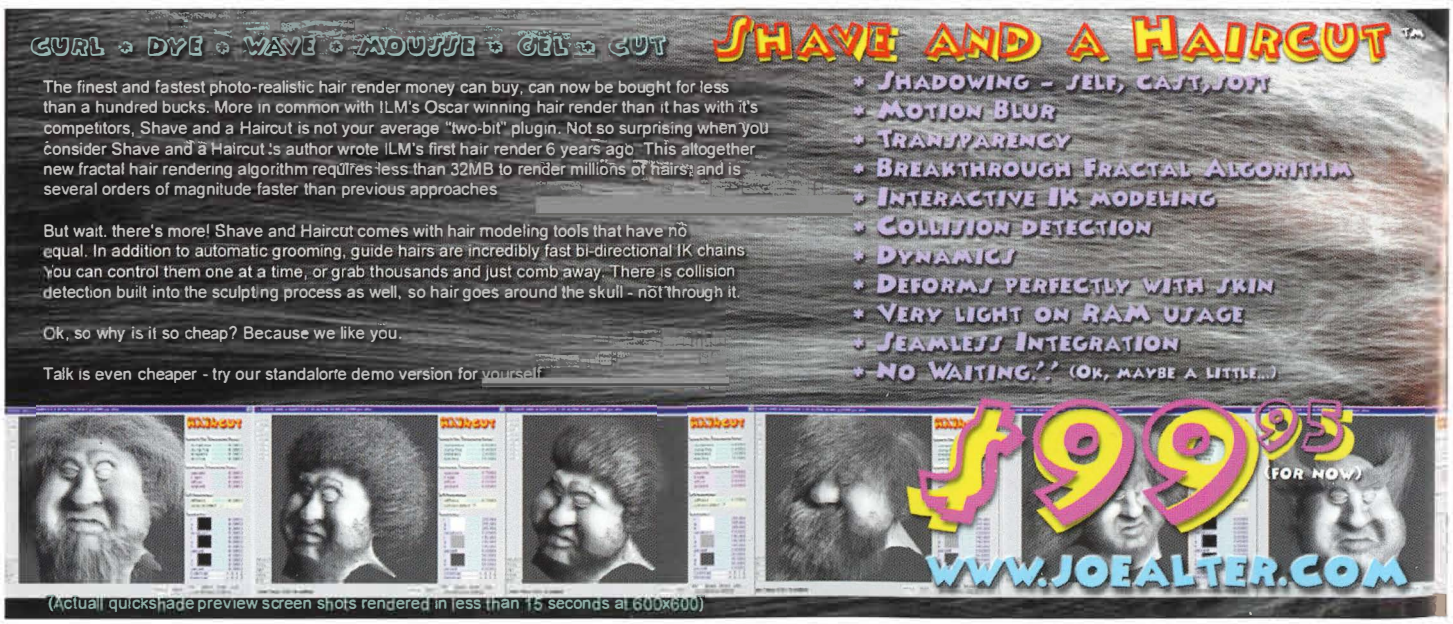
Render a sample of the Eye surface. Select the Iris surface and click on the rendered sample to copy it to the Iris surface. The only change to the Iris surface is to set the Glossiness to 16% so the light will spread out on the iris, illuminating it more. By copying the surface attributes of the Eye surface, we ensure that the Iris surface is seamless and we don't need to make separate image maps. The bump map for the Iris surface is paramount to giving the eye sparkle. By using a high texture amplitude with no antialiasing, we create sharp highlights on the iris surface.

Save the object, then render a test image to check your work. Figure 9 shows a final render of the raptor eye. Notice the depth of the eye. The iris doesn't appear flat, although it actually is, because of the refraction of the cornea. This is why it is so important to model the eye properly. The real evidence of this is when you rotate the eye. You'll see a minor gap between the iris and the cornea's outer edge when you view a real eye from the side, which is exactly how our 3D eye looks. If we used a round sphere for the eye there would be no gap, because the refraction of the eye by the cornea would close the gap.

If you'd rather save a lot of time, you can always get the Dosch Designs eye CD-ROMs that I created, featuring hundreds of fully surfaced photorealistic eyes in several file formats including LightWave. You can find out more at: http://www.doschdesign.de/html/english.htm

I hope this tutorial will send you on your way to creating your own extremely realistic eyes. Making realistic eyes isn't difficult, but it's paramount to the success of your humans and creatures. Don't skimp on eye detail; it can either make or break your character. Both the model and textures are of great importance. I hope we'll have the opportunity soon to explore the creation of eye textures. Until then, Keep it Real!

Bill Fleming is President of Komodo Studio, a leading studio specializing in photorealistic 3D creatures and characters for broadcast and film. Bill is the author of a dozen best-selling 3D books, including "The 3D Creature Workshop" published by Charles River Media, "The 3D Photorealism Toolkit" published by John Wiley & Sons, and his latest, "The Creature Eye Reference Book" available in the Cool Stuff section on the Komodo Studio web site, www.komodostudio.com. Besides being a 3D artist Bill is a psychologist and herpetologist, which has given him a solid background for photorealistic creature design. You can email him at bill@komodostudio.com.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by Matt Morgan

I mostly use brute force and quick hacks to achieve photorealism. I'm not a bevel and rivets guy; I'm more of a blur and fog guy. I'm into whatever works, and I like each minute I spend on something to really count. In production, you often don't get enough time. The methods, order of procedures, and plug-ins you work with must be extremely streamlined if you want to be happy with your end results.

The amazing thing about these four shots is the short amount of time I invested to get them to reality. TwoSwing was completed within 26 hours, SideCU took me 14 hours, Liftup was pretty simple at 10 hours, and Racecam took me 12 hours. All these values are totally real, you could even check the timestamps of my .LWSs and .LWOs. I'm not listing these times to boast, but more to convince you of the importance of good planning, having good reference, and concerning yourself only with what's actually going to be seen. None of these shots used any plug-ins other than Lazypoints. The specular bloom was all done in compositing, using the highlight filter in Digital Fusion. Also, these shot production times don't include the initial model and texture work for the F-14. Andy Wilkoff spent two days hammering out the entire F-14 model, and I spent a full week on the texture maps.

From my reference footage, the Top Gun DVD, I could easily see what I was going to need from my final 2D render. This is very important. At the end of the day, it doesn't matter if you've modeled the nuts and bolts, or have enough segments in your geometry. All that matters is how your final 2D image looks when rendered. This is why getting the whole scene done in pieces works very well. It also helps when it comes to layering it all together in comp, since you've actually created the scene in layers.

My first step is to prioritize what will be taking up most of the screen real estate, as this is what will need the most amount of work. In most of these shots, it's the clouds, sky, and water. For this reason, I treated the background as a separate issue entirely. Some of the backgrounds are using different lighting scenarios than the F-14s. Obviously, if a spotlight cone angle is set up for the F-14, the background is going to be erroneously affected.

For the F-14s, I mostly had to pay attention to their lighting, the amount of haze, some "magic" composite blending, and specularity. The amount of texture detail was another issue, as haze really dummies down textures. I didn't use world fog on any of these shots; instead I used local fog through use of surface colors and grid. For this reason, I used a surface object of the F-14 so I could sweeten the amount of specularity and glossiness from scene to scene.

LiftUp and RaceCam were also going to need particle exhaust. Again, what mattered in the 2D image was not how I created the particles, but rather how they looked and animated. For both of these shots, all I needed was Lazypoints on a particle tube rotating around its bank axis. I then added 2-1/2D lighting to these particles in composite. This was necessary, as particles have no surface normals, so they can't pick up diffuse falloff.

Steamer particles have a similar problem, but the advantage of composite is that you are in real-time, all the time. No tweak steamer, f9, tweak fog, f9, tweak, f9. You adjust something on a slider and it updates in real-time. Work in 3D is becoming more that way (just look at L[6] with Viper), but it's still not to the feedback speed level of 2D. This is, of course, because 2D is much simpler than 3D. However, there are a lot of things we do in 3D that are really 2D.

SideCU

This shot, Figure 1, really depended on my textures holding up, and needed the most attention to lighting. I felt I had really done a bang-up job on the textures, and they were barely getting notice in the other shots. The animation of the pilots wasn't much of a hassle; since I dealt with them separately, they went very quickly. I set up a lame bone setup for them by making a quick spline in modeler, mirroring it, and then using the skeleton maker plug-in. Since they were pretty small in the cockpit, their motion being realistic was much more important than any deformation problems. The pilots were low-poly, and had few bones and no limited region, which meant I could run them in real-time while animating them.

Here are the separate steps I took for this shot:

1) Set up and animated the camera and basic animation of the F-14.
2) Lit the F-14 to be photoreal, simultaneous with tweaking its surface, adjusting specular properties.
2) Modeled and Positioned the Background; I animated the background scrolling, not the camera.
3) Textured the background to be photoreal, renaming lights to reflect their intensities (e.g. Light name "Bounce Side Softener 16%"), so I could set them to 0% for the background render. Otherwise, I'd get shadow map cone angle problems with the background, and I only needed 2 lights for the background, compared to the 6 lights that I needed for the plane.
4) Starting in a separate scene, I set up simple bones for the pilots and animated them.
5) Using Load From Scene, I brought the pilots in, and rendered out the plane layer.
6) Disabling the lights, I rendered out the background layer.
7) I then rendered out an alpha for part of the fuselage, to be used as a mask in composite for some slight depth of field blur.
8) Brought it all together in comp, adding "edge blur" to the plane and color bleed to the background.

The background for this shot consisted of 2 mountains that were modeled totally flat using the pen tool: a single polygon for the sky, and a slightly magneted polygon plane for the clouds, Figure 2.

The clouds used 5 Texture Nulls. Surface color and 2 layers of fractal noise for the color channel, 1 layer of grid and 4 layers of fractal noise for the transparency channel, and 4 layers of crumple and 2 layers of fractal bumps for the bump channel. A couple procedurals of grid and fractal noise were used for the sky and mountains. Almost all the procedurals I used for all of these shots have texture falloff.

These are the steps I took in compositing: I blurred the background layer by 3 pixels. I blurred the F-14 layer by 80 pixels and composited it over the background at 15% for a slight color bleed and better integration. I then composited the 'straight out of 3D' F-14 over the background. Using the rendered

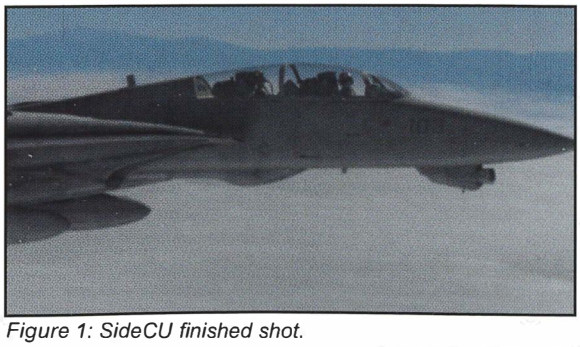

Figure 1: SideCU finished shot.

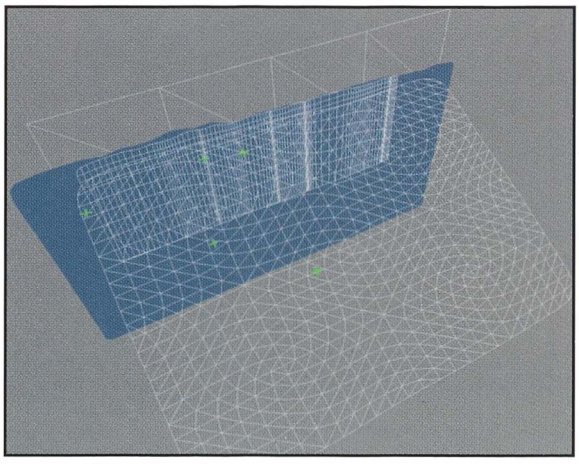

Figure 2: Background scene for SideCU shot.

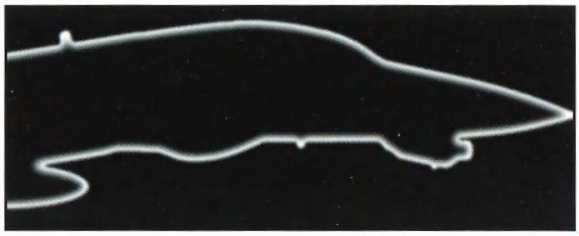

Figure 3: Mask for compositing F-14 edges.

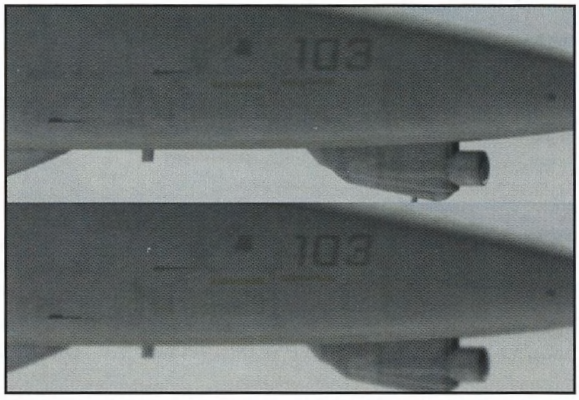

Figure 4: Before (top) and after (bottom) showing effect of mask on final composite.

Figure 5: Final TwoSwing shot.

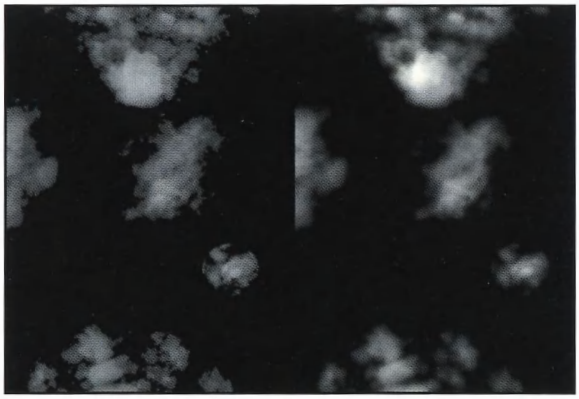

Figure 6: Clouds, before and after.

alpha channel, I created a mask for the edge of the F-14, Figure 3.

I used this mask to "weld" the plane into the background; see the before-and-after Figure 4. This blurs those CG edges, but not the plane itself. Since I was blurring on top of the composite, it really welds the plane into the background. I finished off with a slight depth of field blur using the mask of the fuselage, and added a layer at 10% of extremely subtle air/cloud wisps going by really fast. This layer was just a stretched-out fractal image using a right to left 2D move. All this was topped off with film grain of course.

TwoSwing

This was the first of the four shots I attempted, Figure 5.

I used Hypervoxels for the clouds, using individual null objects for each. Some of the clouds were made up of a couple nulls, as this helped to better define shapes. Even though I've had a lot of experience with Hypervoxels, there is still a grand amount of tweaking I have to do. You need to tweak voxels for quite a while to get them to be completely photoreal, or to match plate photography. I tweaked with them for almost a full day and still wasn't too happy with the results. A full day isn't much for voxel tweaking, but I was getting bored. I then switched over to compositing, and about a half-hour later I was much happier with the results, Figure 6.

Most of the 18 operations I used in Digital Fusion didn't actually do anything to the clouds; they were just used for making masks. I then used these masks for blurring, eating away, and varying the density of the clouds. The biggest difference came from the 2D Lighting using an offset mask of the clouds. The comparative image is just the cloud layer alone, at full strength. In the actual composite it gets merged in at only 60%, and there is also the shadow of the clouds on the water to help integrate them. The Shadow was also achieved in composite by enlarging and offsetting the clouds, and setting their color channel to black. Although composite really helped out, I'm not completely happy with the clouds. What a contrast these clouds are to the clouds in the SideCU, or RaceCam. I couldn't be more happy with the way those clouds turned out, and those were made using simple procedurals we've had since LightWave 4!

The motion on this shot needed a lot of tweaking; too much. I hate to admit it, but it was a problem with my tools. I actually sort of gave up after a whole day of tweaking a single motion spline! Animating a character with 250 limbs was easier than tweaking a single spline? How can this be? This is the first shot I've ever done where I finally realized the need for separate motion channels, as well as acceleration and velocity controls. I've never animated any spaceships or cars, so I guess that's why I've never noticed this problem. Messiah or L[6] would be perfect for this shot. Some day soon, I'll load my .LWS for this scene into messiah and use the acceleration controls to do a quick fix on the motion. About mid-way through tweaking, I did break off each channel using separate nulls. This helped, but without being able to separate acceleration controls from tension controls, I just couldn't get rid of the slight velocity hiccup.

What I really like about this shot is the way the F-14s look, their bright specular kicks, and the water. The water was achieved with 12 procedurals and an image map in the bump channel of tree bark. The large specular highlight was created with a layer of white fractal noise and grid in the color channel attached to a texture null that was animated using a similar motion spline to that of the camera, so that they'd correlate properly. There were a total of 4 texture nulls for the water, with subtle animation of the nulls moving on the y, along with scaling on the x, with lots of tweaked spline tension. Along with all texture falloff and variation, this gave an extremely convincing look of water at a far distance.

LiftUp

This shot was just way too simple. With the amount of fog, and with the plane being in shadow for most of the shot, I mostly had to worry about the movement and the jet exhaust. I didn't need to bother with any heat distortion, as it was not noticeable from the reference footage. To get the slight highlight on the F-14s exhaust, I used a similar technique for 2D Lighting, as I did with the highlight for the clouds in the TwoSwing shot. I also added an animated color gain in composite to help out the shadowing changes the F-14 goes though as it lifts up.

Figure 7: LiftUp final shot. [TG_Liftup_0026.tif]

RaceCam

I really didn't complete this shot, as I hadn't fully finished my tweaks with the surface object. In my preview renders, the F-14 looked a little like die-cast metal. When I checked my initial composite on video, everything looked fine, so I stopped working on it. It's kind of humorous to me, but when I saw it actually moving in the format it was designed for, those few frames where it looked like die-cast metal just weren't noticeable, Figure 8.

Figure 8: RaceCam final shot. [TG_Racecam_0070.tif]

The background for this used the most procedurals I've ever applied to a single surface. The cloud surface uses 25 procedurals! I would probably laugh if another artist had such a surface (which I guess kind of makes me a hypocrite), but it just worked out that way. The clouds used 7 Texture Nulls, surface color, 11 layers of grid, and 10 layers of fractal noise for the color channel, 1 layer of grid and 2 layers of fractal noise for the transparency channel, and 1 layer of crumple for the bump channel. 5 procedurals of grid were used for the sky.

continued on page 38

SPIDER

Station X Studios
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Price per CPU $89.00
Site License $6000.00

reviewed by Jason Goodman

Successful network rendering is one of life's finer pleasures. When I first started working in 3D, like many of you, I was using an Amiga. At 7.14Mhz, rendering frames was worse than watching paint dry. It was like watching water dry. Wet water. It was slow. In later years, NewTek brought us ScreamerNet. This allowed the truly industrious to link a bunch of Amigas together and watch paint dry considerably faster. This breakthrough is what made the show Babylon 5 possible.

Network rendering is a great concept, especially with today's proliferation of 500+ MHz computers and incredibly low prices. Many users find themselves with two, three or more computers. NewTek has done tremendous work with ScreamerNet, but it is showing its age. LightWave 6.0 brings us Stealth Net. I have not had a chance to look at it, but interestingly ScreamerNet is still a part of LW6. ScreamerNet's sparse user interface and troublesome limitations make it a problem for some users. There have been several alternate network rendering tools presented throughout the course of LightWave's history. WaveNet Pro, Renderfarmer, Netrender and others.

Spider is the network rendering entry from Station X Studios. If you have been living under a rock for the past three years, you may not know that Station X Studios is comprised of many talented individuals who brought us everything from Titanic to MetaNURBS. This team of animators and programmers has also brought us the next wave in network rendering.

Spider currently works with Intel/Alpha NT 4.0 and Win2000 only. If you are using 95, 98, Sun, SGI or the Mac OS you are presently out of luck. Station X has plans to support other platforms, but no release dates have been set. Spider runs as an NT process, giving it much more flexibility than network rendering software that runs as an application. The best things about Spider are its answers to the worst things in ScreamerNet. Spider has multiple safeguards and settings to ensure your renders complete successfully.

The "Requeue at X% average" option is extremely useful. This allows the user to define a cutoff time, which is significantly larger than the average amount of time taken to render a frame. If a CPU freezes or crashes while rendering, after the specified time period, the unfinished frame will be put back in the queue to be rendered. As a process, Spider comes back online as soon as the crashed machine does. Even if the Spider server crashes, the render will automatically continue on restart, assuming you manually or automatically login to NT. You can also set Spider to detect "bad CPUs" and kick a machine out of the render based on the number of times it crashes.

Spider also offers the ability to edit many aspects of the render while it is in progress. This includes the ability to dynamically add and remove CPUs and/or frames while the render is in progress. A user can also change a scene's render priority, or alter multithreading options. The Spider Control panel shows you the rendering and online status of each machine in the rendering network.

Another fine feature is the recording of important data about each render. Recorded data on frames, CPUs and render times is voluminous and easily accessible. Spider retains this information even after the render has completed. Details include start and finish times, total render time, information on which frame was rendered by which machine and more. This information can be invaluable in troubleshooting problem renders and is sorely missed in ScreamerNet. You will also find this data useful for doing time tests between machines. Spider is really great for studios in which many animators are working on different scenes and submitting multiple scenes to be rendered. Users do not need to wait for others to finish, or even get up from their workstation to set up a render on all other machines.

Overall, Spider is powerful and easy to use. However, I did run into a few gotchas. Users who are unfamiliar with setting up NT accounts may have trouble during installation. Keep one of those "Windows NT for Dummies" books nearby. In general, if you are not an advanced user, installation can be confusing. Setting up the LightWave config files on all the machines can be tricky as well. You need to have all image saver plug-ins listed in the same order in each of the config files you are using. The easiest way to accomplish this is to use one network-accessible config file instead of those on each machine's local drive. If you plan on using Intel and Alpha CPUs, you will need to compare your Intel and Alpha config files to make sure the image saver plug-ins are listed in the same order on both platforms. Alpha machines using the network (Intel) config would screw up and not be able to save the frames; they should use a local Alpha config. This is not really Spider's fault, but it can be an annoying issue nonetheless.

Another thing that did not excite me was the fact that Spider's documentation is only available as HTML. HTML docs are cheap and convenient for the publisher, but can be a pain in the rump for users. At the very least, a PDF version would be appreciated.

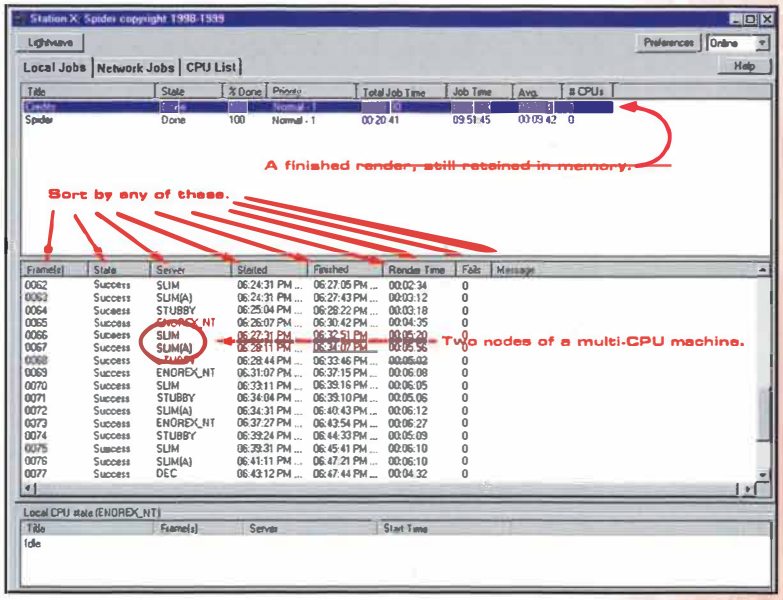
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Figure 1: Spider interface.

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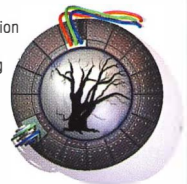

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I got a sneak peak at a forthcoming beta version, which will add a number of improvements. The next version of Spider will support LW6 and provide access to your scenes' camera and render setting from within the Spider interface. Users will be able to set up automated email notifications of render status, scan a sequence for missing frames and more. Station X is also working on support for other rendering applications.

Spider is great, but it is not for everyone. If your render network is small, or if your work is not extremely deadline sensitive, Spider may be overkill. It is costly compared to ScreamerNet and it supports a limited number of platforms. Sun, SGI, and Mac users presently have no use for it at all. However, Windows users should give Spider serious consideration. If lost time rendering equals lost money at your studio, Spider could be like money in the bank.

** Special thanks to Stephan Baker for his research and help in writing this review*

World Const. Set v5

3D Nature, LLC
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reviewed by Sam Bowling

In my opinion, World Construction Set is one of the premiere 3D terrain rendering and visualization programs on the market. Designed for 3D artists and GIS (Geographic Information Systems) professionals, World Construction Set can render anything from a few meters of terrain to the entire planet. Trees and other foliage can be either image objects or 3d objects and are placed on the terrain based on rules of nature. This means that you can control where plants grow not only by terrain slope and elevation, but you can also simulate the effect of poor drainage, dry or wind-eroded areas, and areas that don't get a lot of sun. In short World Construction Set enables you to create a large amount of very realistic terrain in a short amount of time.

With the Version 5 release, you can concentrate more on what you're creating and less on how you're creating it. The interface has been completely redesigned allowing you to have multiple docked or floating views and editors and has a component bar (called Scene-at-a-Glance) that contains expandable tree views of all the parameters for your project. Scene-at-a-Glance components can be copied by drag-and-drop, and the editors and parameters can be filtered by component category (sky, water, foliage, etc.) to help reduce screen clutter.

The texture engine is of the most powerful and prominent features in World Construction Set 5. The texture engine has been enhanced, enabling you to control textures on terrain objects based on terrain parameters such as slope, elevation and water level, and has been integrated into almost every aspect of the program. It can be used to create clouds and waves or to control the density, size and placement of foliage, displace the terrain, and to texture the terrain and 3D objects. Nearly every aspect of the texture editor can be animated, enabling you to animate almost everything that is controlled by textures. One benefit of having the texture editor in so many places is that once you become familiar with it, you are also familiar with a lot of the program.

Some of the new or improved features in World Construction Set 5 include: multiple cameras; panoramic cameras; better interactive camera control (WCS now has an interactive camera mode similar to LightWave); non-targeted cameras; multiple light sources; improved foliage rendering; volumetric atmospheres; stars; improved shadow handling; improved image object shading; soft shadows; improved rendering engine; faster and more robust OpenGL display; and the ability to import a wide variety of terrain formats.

One timesaving feature is the component system. Using this, you can save your ecosystems, oceans, skies and other parameters to disk to reuse in other projects. You could set up and save commonly used parameters to disk so you don't have to recreate them every time you need them in a new project. You can also use the component system to retrieve parameters from an older version of a project if you've accidentally deleted something.

So, where will this program come in handy for a LightWave animator? Just about anywhere you need terrain rendering in your projects. While World Construction Set isn't a plug-in for LightWave, it still has the ability to interact with LightWave through the included ZBuffer plug-in. This plug-in allows you to move LightWave objects around in your World Construction Set renderings by compositing the images pixel-by-pixel at the appropriate distance from the camera. For those of you who prefer to do compositing in other programs, World Construction Set now supports RLA output for programs such as Adobe After Effects or Discreet effect*. One of the disadvantages to the ZBuffer approach is that if you move the camera in LightWave you will need to import the camera motion back into World Construction Set and render your frames and ZBuffer data again. Another disadvantage to this is that the ZBuffer images will not be reflected onto LightWave objects. However, World Construction Set 5 has the ability to render panoramic images. You can load your object path into World Construction Set as a camera path, render out a small panoramic image or sequence for the reflective object, then use it as a reflection map for your LightWave object. One other thing that you may notice is missing is bump mapping. While WCS doesn't yet support bump mapping, you can use textures and images to displace the terrain and water. At times when you can't do without bump mapping, you would need to use LightWave and the ZBuffer plug-in.

World Construction Set 5 ran night and day for more than a week under Windows 2000 without a crash. Most of the time it was rendering while I had my mail client, browser, word processor and LightWave open. I also used beta versions under Windows 98 and had no major stability problems.

World Construction Set is relatively inexpensive for what you get. No other terrain-rendering program I've seen can compare with the features, quality and realistic output of World Construction Set 5.

World Construction Set has a fairly steep learning curve. However, creating great looking landscapes becomes fairly easy once you get the hang of the terms and procedures. If you are familiar with GIS terms and working with real world coordinates (latitude, longitude, etc.), becoming proficient with WCS will be even easier. You don't want to skip over the tutorials; these are the fastest way to learn how to work efficiently with World Construction Set, and skipping them will make everything more difficult. World

Construction Set also includes an extensive online help system. Hitting the F1 key or clicking on the Help button in any editor will bring up detailed descriptions of the parameters for that editor.

The one real danger in using World Construction Set 5 is that you easily lose track of time just playing around with all the cool features. There were many times while writing this review that I went into World Construction Set to do some fact checking and ended up messing around with a previously unseen or unexplored feature for hours. With the new interface and new features this program has become a real pleasure to use, and I can see myself finding excuses to include outdoor scenery in future projects. If you used earlier versions of World Construction Set but were turned off by the interface, or if you have never used World Construction Set, I definitely recommend that you check out World Construction Set 5

PLUG-IN COMPATIBILITY

compiled by Julian Kain

While LightWave 5.6 had several hundred plug-ins that were compatible with it, the release of the completely rebuilt and reprogrammed LightWave 6 has brought some ambiguity to the status of several plug-ins. Many are completely compatible with L[6]. Others have interface bugs or similar quirks, while others fail to work at all. Many developers are working hard to update the compatibility of their plug-ins for L[6], and have released (or will be releasing) compatibility patches. Below is a compiled list of some of LightWave 5.6's most popular plug-ins, and their compatibility status under L[6].

Plug-in name *Particle Storm 2 Pro v2.5*
Plug-in description *LightWave's most advanced particle effects engine comes to LightWave version 6! Explosions, flocking, swarming, spawning, wind, particle collision all become reality with PS2 Pro!*
Company name *Dynamic Realities*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *Free patch*
Upgrade date *Now*
Formats supported *Intel, Mac, ALPHA*

Plug-in name *Shave and a Haircut*
Plug-in description *A hair rendering solution*
Company name *Joe Alter, Inc.*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *Free patch*
Upgrade date *Now*
Formats supported *Intel*

Plug-in name *LipService*
Plug-in description *A facial animation solution*
Company name *Joe Alter, Inc.*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *Free patch*
Upgrade date *Now*
Formats supported *Intel*

Plug-in name *Relativity*
Plug-in description *The Ultimate Expression Engine for LightWave!*
Company name *Prem Subrahmanyam Graphic Design*
Working with L6? *No*
Perfectly compatible in L6? *No*
Current bugs *Several issues arose in the transition from the 5.6 SDK to the 6.0 SDK. These are being resolved and should be completed by the publication of the magazine.*
Kind of upgrade *Free patch*
Upgrade date *April 2000*
Formats supported *Intel*

Plug-in name *Surface Effectors*
Plug-in description *Dynamic Surfacing Plug-in for LightWave*
Company name *Prem Subrahmanyam Graphic Design*
Working with L6? *No*
Perfectly compatible in L6? *No*
Current bugs *Several issues arose in the transition from the 5.6 SDK to the 6.0 SDK. These are being resolved and should be completed by the publication of the magazine.*
Kind of upgrade *Free patch*
Upgrade date *April 2000*
Formats supported *Intel*

Plug-in name *CTBFproc*
Plug-in description *LW6 Procedural Texture that uses Cellular Texture Basis Functions*
Company name *Marvin Landis*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Plug-in name *CTBFtoy*
Plug-in description *LW6 Shader plug-in that uses Cellular Texture Basis Functions*
Company name *Marvin Landis*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Plug-in name *CTBFtoy*
Plug-in description LW6 *Shader plug-in that uses Cellular Texture Basis Functions*
Company name *Marvin Landis*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Plug-in name *DEMScape*
Plug-in description *LW6 Modeler plug-in for creating optimized landscapes from USGS DEM files*
Company name *Marvin Landis*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Plug-in name *LOD*
Plug-in description *Layout object replacement plug-in based on object's distance to the camera*
Company name *Marvin Landis*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Plug-in name *Shades*
Plug-in description *A collaborative Shader plug-in project*
Company name *Marvin Landis*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Plug-in name *VertiBevel*
Plug-in description *Powerful multi-polygon multi-step beveling plug-in for Modeler*
Company name *Shekinah Studios*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*

Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Plug-in name *ManualSort 1.3*
Plug-in description *Allows for rearranging of any object or bone*
Company name *DNA Productions, Inc.*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *The current version requires editing a text file generated by MSort via a text editor (i.e., WordPad). All rearrangements & deletions are to be made from within the text file. As time allows, an internal GUI editor will be provided. Manual Sort 1.3 works with both 5.x and 6.x scenes.*
Kind of upgrade *Free Version Upgrade*
Upgrade date *Future upgrades and fixes will be made free of charge*
Formats supported *Intel*

Plug-in name *Light Diffusion (Vertilities)*
Plug-in description *Adds an optic bloom effect*
Company name *Foundation Imaging*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Plug-in name *IFW Textures*
Plug-in description *Over 120 advanced procedural shaders for LightWave and Inspire*
Company name *The Graphics Factory*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Plug-in name *BendyPoints*
Plug-in description *Character animation displacement map plug-in*
Company name *Catalyst Pictures Ltd.*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *Paid version upgrade*
Upgrade date *Now*
Formats supported *Intel*

Plug-in name *NatureFX*
Plug-in description *Water, waves, ripples, clouds, and atmosphere are supported. As seen in* Deep Blue Sea *and other movies.*
Company name *Dynamic Realities*
Working with L6? *No*
Perfectly compatible in L6? *No*
Current bugs *Interface bugs and certain volumetric rendering problems.*
Kind of upgrade *Free patch*
Upgrade date *March 20, 2000*
Formats supported *Intel, Mac, ALPHA*

Plug-in name *Impact 2.0*
Plug-in description *Rigid body dynamics made easy! Supports collision detection with definable friction and bounciness, as well as several kinds of constraints.*
Company name *Dynamic Realities*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *Interface bugs and certain volumetric rendering problems.*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel, Mac, ALPHA*

Plug-in name *LumeTools*
Plug-in description *A jam-packed set of utilities supporting sub-pixel displacement, several volumetric shaders, simple water, and much more.*
Company name *Dynamic Realities*
Working with L6? *No*
Perfectly compatible in L6? *No*
Current bugs *Interface issues.*
Kind of upgrade *Free patch*
Upgrade date *April, 2000*
Formats supported *Intel, Mac, ALPHA*

Plug-in name *RealiTools volumes 1 & 2*
Plug-in description *A two-volume set jam-packed with utilities including Fresnel, Lighter, distance measuring, ortho-view, and much more!*
Company name *Dynamic Realities*
Working with L6? *No*
Perfectly compatible in L6? *No*
Current bugs *Interface issues.*
Kind of upgrade *Free patch*
Upgrade date *April, 2000*
Formats supported *Intel, Mac, ALPHA*

Plug-in name *TreeDruid*
Plug-in description *Tree generator, that can be animated over time*
Company name *Dynamic Realities*
Working with L6? *No*
Perfectly compatible in L6? *No*
Current bugs *Interface issues.*
Kind of upgrade *Free patch*
Upgrade date *May, 2000*
Formats supported *Intel, Mac, ALPHA*

Plug-in name *Thor*
Plug-in description *Lightning generator*
Company name *Dynamic Realities*
Working with L6? *No*
Perfectly compatible in L6? *No*
Current bugs *Interface issues.*
Kind of upgrade *Free patch*
Upgrade date *May, 2000*
Formats supported *Intel, Mac, ALPHA*

Plug-in name *DarkTree Textures*
Plug-in description *DarkTree Textures is a shader/procedural texture plug-in for LightWave that allows you to visually design complex animated 3D surfaces.*
Company name *Darkling Simulations*
Working with L6? *Yes*
Perfectly compatible in L6? *Yes*
Current bugs *N/A*
Kind of upgrade *N/A*
Upgrade date *N/A*
Formats supported *Intel*

Highway to the Danger Zone
Continued from Page 32

I started with a base of fractal noise and crust, mostly working on colors and general shading. I only spent a couple of hours on it, but before I knew it, I had a full-blown shader on my hands. Since most of the procedurals have a low number of frequencies, the first frame of the background renders in just 19 seconds with low antialiasing on a single PII 400, which is pretty fast for 25 procedurals. However, the last frame takes 82 seconds. The reasons why this frame takes longer are because the clouds are taking up more of the frame, and the side of the clouds with the most amount of variation is showing. This is why so many procedurals were necessary.

I Still Know What You Did Last Summer?

Video is a very different beast than a computer monitor or print. I'm not sure how well these shots look printed, as they were really tweaked out in composite for display on video. I have individual .IFFs of every frame available for download from my web site, so for everyone with a PVR/Toaster/etc., please feel free to download them, watch them on video, and send me your comments. Literally hundreds of people have seen these shots, and everyone has been completely fooled. Obviously, having good reference to start from was my friend.

As you can see, with each subsequent shot I was getting quicker and quicker. At the end, I felt like I could take on Top Gun 2 myself in about 3 months (ha ha ha). Oh, and on a final note, I did put rivets into the texture maps!

Matt Morgan is a senior animator at Threshold Digital. You can check out his web site at www.fxartist.com or email him at matt@threshold-digital.com.

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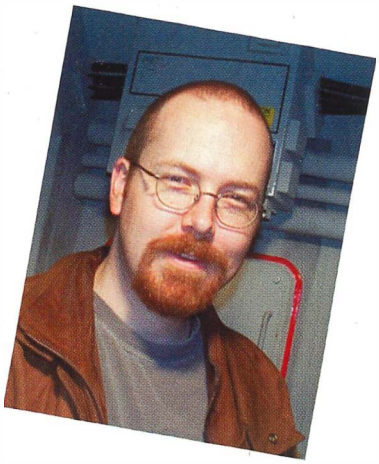
Final Cut

by Steve Pugh



No, it's not one of those columns, so please keep those Dockers and goofy big rave jeans buckled, thanks. Rather, I was finishing up some pretty tasty Chinese last night and got to thinking about the creative possibilities offered up by this newest build of LightWave, and other new tools dancing along the horizon.

Back in the early days of LightWave, I was just peeking into the computer animation world and was fairly ignorant of the possibilities that it offered the storyteller. I'd heard of Luxo, Jr., but hadn't seen more than stills from the film, and there was precious little other character animation done with computers. Granted, the tools back then were pretty clunky compared to what we have at our disposal today.

Consider this: today's lower mid-range computers are orders of magnitude faster than what an aspiring CG filmmaker could have gotten his hands on back then. Not that any of us have a spare air-conditioned garage for a Cray anyhow, but pop down to Sears and you can probably pick up a machine that'll draw you a fair bunch of pictures overnight and still fit under the desk. Try, just try to buy a machine these days with a hard disk that won't hold a few minutes of AVI files; I bet it'll be difficult.

When it comes to software for the animation storyteller, we're in a good place right now. From the writing angle, programs like Dramatica and Writer's Blocks are waiting to help you lay out your thoughts before you even open up Modeler. I'm a big fan of Final Draft for writing screenplays, and wish I'd had it in high school when I was using a typewriter for my scripts. Can you believe those typewriters didn't have a block-centering function? How did anyone get anything done back then?

Then there's the animation software itself. I know I'm not alone in dusting off my rocker and lap blanket and fondly remembering the days of LightWave 1.0. It was a tasty piece of code, and it put an awful lot of people onto the CGI visual effects map. Add five to the version number, and this year you're looking at UV mapping, these crazy Skelegons, and tools like Morf Mixer to make building and animating characters easier. New packages exist that make lip syncing dialog a thing of great joy and beauty, and nonlinear editing software like Premiere lets you hone the finished piece to your heart's content.

So what's missing? It's no small feat to produce a few minutes of cohesive story, that's for sure. Things like dialog and timing are hard to get just right, especially if you approached 3D from the 'want to make photoreal models, damn the timing!' angle. But it doesn't take an epic saga to tell a good story, either. Look at Luxo, Jr. or Joe Alter's Jersey and see how effective a simple story can be. There's Tripping the Rift and Los Gringos to show how far you can go with (what I consider to be) funny dialog.

Why the obsession with short films? Because they're neat, that's why. A good short film gives enough enjoyment to be talked about for weeks, if not months, if not years, with a minimal investment of spectatorial time (Gawd, I love making up words). Moreover, short films are giving the Internet broadcast companies a fighting chance at getting content out there over today's fast-but-not-fast-enough-for-features DSL and cable modem lines. So go on, I dare you. Write something, double-click on that little squiggly spiral thing, and tell us a story.

Steve Pugh is the General Manager at Foundation Imaging. If he's not daydreaming or fighting a mental block, you can contact him through their website, www.foundation-i.com.

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